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EEI BULLETIN

• FEBRUARY, 1960 •

Report on USSR Power Developments 1958-1959

with Analyses by
Walker L. Cisler and Donald S. Kennedy

Growth in Electric Power to Serve America

Allen S. King

EEI Sales Conference Program

Report on Extra-High-Voltage Cable Field Test Project

L. G. Smith and G. P. Adams

PUBLISHED BY EDISON ELECTRIC INSTITUTE

ELECTRIC UTILITY INDUSTRY Statistics IN THE UNITED STATES

for NOVEMBER 1959

Current Statistical Data Covering 100 Percent of Industry

(Includes Investor-Owned Companies, Cooperatives, and Government-Owned Utilities) — November, 1959

	1959	1958	%
SOURCE AND DISPOSAL OF ENERGY			
NET GENERATION* (Kwhr in Thousands)			
By Fuel Burning Plants	46,764,356	43,375,729	+ 7.8
By Water Power Plants	11,668,186	10,545,440	+10.6
Total Generation	**58,432,542**	**53,921,169**	**+ 8.4**
Add—Net Imports over International Boundaries	370,668	346,389	+ 7.0
Less—Company Use	166,037	153,479	+ 8.2
Less—Energy Used by Producer	1,411,272	1,338,186	+ 5.5
Net Energy for Distribution	**57,225,901**	**52,775,893**	**+ 8.4**
Lost and Unaccounted for	5,537,469	4,930,596	+12.3
Sales to Ultimate Customers	**51,688,432**	**47,845,297**	**+ 8.0**
CLASSIFICATION OF SALES			
NUMBER OF CUSTOMERS—As of November 30			
Residential or Domestic	48,857,392	47,693,764	+ 2.4
Rural (Distinct Rural Rates)	1,661,810	1,634,774	+ 1.7
Commercial or Industrial:			
Small Light and Power	6,362,808	6,291,846	+ 1.1
Large Light and Power	323,778	315,648	+ 2.6
Other Customers	194,546	188,376	+ 3.3
Total Ultimate Customers	**57,400,334**	**56,124,408**	**+ 2.3**
KILOWATT-HOUR SALES—During Month of November (Kwhr in Thousands)			
Residential or Domestic	14,313,943	12,897,664	+11.0
Rural (Distinct Rural Rates)	874,920	794,381	+10.1
Commercial or Industrial:			
Small Light and Power	9,243,775	8,364,429	+10.5
Large Light and Power	25,046,809	23,817,295	+ 5.2
Street and Highway Lighting	561,088	526,385	+ 6.6
Other Public Authorities	1,203,931	1,093,809	+10.1
Railroads and Railways	401,297	303,568	+32.2**
Interdepartmental	42,669	47,766	−10.7
Total to Ultimate Customers	**51,688,432**	**47,845,297**	**+ 8.0**
Revenue from Ultimate Customers (Thousands)	**$881,613**	**$814,725**	**+ 8.2**
RESIDENTIAL OR DOMESTIC SERVICE			
AVERAGE CUSTOMER DATA—for 12 months ended November 30, 1959			
Kilowatt-hours per Customer	3,562	3,353	+ 6.2
Average Annual Bill	$89.41	$84.83	+ 5.4
Revenue per Kilowatt-hour	2.51¢	2.53¢	− 0.8

* By courtesy of the Federal Power Commission.

** Due to increased kwhr sales to New York City Transit Authority.

Vol. 28 • No. 2

EEI BULLETIN Contents

February, 1960

Articles, Speeches, Reports

A Report on USSR Electric Power Developments, 1958-1959 35

A Look at the Russian Electric Industry
Walker L. Cisler 36

The Power Industry in the USA and in Russia
Donald S. Kennedy 39

Growth in Electric Power to Serve America
Allen S. King 42

Electronics Seminar Stresses Importance of Computers 47

'Sell Electric All the Way' to Be Theme of EEI Sales Conference 48

LBE Women's Conference Views 1960's as Total Electric Living Era 50

134 Safety Achievement Awards Presented Last Year 54

Selling All Company Services
Suzanne Wofford 57

Progress Report No. 5, AEIC-EEI Extra-High-Voltage Cable Field Test Project
L. G. Smith and G. P. Adams 59

News, Notes, Miscellany

Conventions and Meetings 34

Southern California Edison to Erect a 10-Story Building ... 38

Georgia Power to Give Music Scholarships 41

Purchasing and Stores Meeting Planned May 2-4 49

First Energy Institute to Be Held in Washington 53

New Report on U. S. Power Situation Available from the Institute 53

How the Seminoles Live Better Electrically 55

People in Power 62

Carolina P&L, Duke Plan for Youth Atom Conference 64

Specification Available on Steam Turbines 64

The EDISON ELECTRIC INSTITUTE BULLETIN is published monthly, except bi-monthly in July and August, by the Edison Electric Institute, an association of electric light and power companies in the United States and its territorial possessions. Its affiliate members consist of private electric utilities in North, Central and South America and contiguous islands in the Western Hemisphere.

The objectives of the Edison Electric Institute are:

The advancement in the public service of the art of producing, transmitting, and distributing electricity and the promotion of scientific research in such field.

The ascertainment and making available to the members and the public of factual information, data, and statistics relating to the electric industry.

To aid its operating company members to generate and sell electric energy at the lowest possible price commensurate with safe and adequate service, giving due regard to the interests of consumer, investor, and employee.

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CONVENTIONS AND MEETINGS

1960

FEBRUARY

29-
Mar. 1 EEI Residential Electric Heating & Air Conditioning Committee, EEI Headquarters, New York, N. Y.

29-
Mar. 1 Pacific Coast Electrical Association Business Development Conference, Lafayette Hotel, Long Beach, Calif.

MARCH

17-18 EEI Industrial Relations Committee, Mayflower Hotel, Washington, D. C.

21-23 Southeastern Electric Exchange Annual Conference, Boca Raton Hotel and Club, Boca Raton, Fla.

23 Oklahoma Utilities Association Accounting Section Meeting, Biltmore Hotel, Oklahoma City, Okla.

24-25 Oklahoma Utilities Association Convention, Biltmore Hotel, Oklahoma City, Okla.

28-29 Pacific Coast Electrical Association Engineering and Operating Conference, San Francisco, Calif.

29 Public Utilities Association of the Virginias Rural Committee, Jackson's Mill, W. Va.

29-31 ASME American Power Conference, Sherman Hotel, Chicago, Ill.

31 EEI Area Development Committee, Chalfonte-Haddon Hall, Atlantic City, N. J.

APRIL

3- 8 AIEE Engineers Joint Council Nuclear Congress, New York, N. Y.

4 EEI Advertising Committee, Edgewater Beach Hotel, Chicago, Ill.

4 EEI Commercial Group Committees, Edgewater Beach Hotel, Chicago, Ill.

4 EEI Farm Development Committee, Edgewater Beach Hotel, Chicago, Ill.

4 EEI Farm Promotion Committee, Edgewater Beach Hotel, Chicago, Ill.

4 EEI Industrial Power & Heating Group, Edgewater Beach Hotel, Chicago, Ill.

4 EEI Market Research Committee, Edgewater Beach Hotel, Chicago, Ill.

4 EEI Residential Group Committees, Edgewater Beach Hotel, Chicago, Ill.

4 EEI Sales Personnel & Training Committee, Edgewater Beach Hotel, Chicago, Ill.

4- 6 EEI Annual Sales Conference, Edgewater Beach Hotel, Chicago, Ill.

7- 8 EEI Power Survey Committee Meeting, EEI Headquarters, New York, N. Y.

7- 8 Southeastern Electric Exchange Engineering & Operation Section Conference, Roosevelt Hotel, New Orleans, La.

11-12 Pacific Coast Electrical Association Administrative Services Conference, Huntington-Sheraton Hotel, Pasadena, Calif.

20-22 Missouri Valley Electric Association Engineering Conference, President Hotel, Kansas City, Mo.

21-22 EEI Industrial Relations Committee Joint with the New England Regional Utility Group, Somerset Hotel, Boston, Mass.

25-27 EEI Accident Prevention Committee, Desert Ranch, St. Petersburg, Fla.

25-27 EEI-AGA National Conference of Electric & Gas Utility Accountants, Hotels Commodore and Roosevelt, New York, N. Y.

25-28 EEI Hydraulic Power Committee, Benjamin Franklin Hotel, Philadelphia, Pa.

27-29 EEI Insurance Committee, Longfellow House, Pascagoula, Miss.

27-29 NELPA Engineering and Operation Section Joint with Personnel and Safety Section, Hotel Florence, Missoula, Mont.

28-29 EEI Statistical Committee, New Orleans, La.

28-29 PEA Systems Operation Committee, Bedford Springs Hotel, Bedford, Pa.

MAY

1- 4 National Association of Electrical Distributors 52nd Annual Convention, Memorial Auditorium, Dallas, Texas

2- 4 EEI Prime Movers Committee, Hotel Monteleone, New Orleans, La.

2- 4 EEI Purchasing & Stores Committee Annual Meeting, The Warwick, Philadelphia, Pa.

9-13 EEI-AGA 19th Annual Conference on Operation of Public Utility Motor Vehicles, Jung & Roosevelt Hotels, New Orleans, La.

10-12 AIEE Farm Electrification Conference, Sheraton-Fontenell Hotel, Omaha, Neb.

11 ECAP Copy Group Meeting, New York, N. Y.

12-13 EEI Transmission & Distribution Committee, Penn-Sheraton Hotel, Pittsburgh, Pa.

16-17 EEI Electrical System & Equipment Committee, Baker Hotel, Dallas, Texas

16-18 Pacific Coast Electrical Association Annual Convention, Stardust Hotel, Las Vegas, Nev.

17-18 National Safety Council Public Utilities Section Executive Committee, Sheraton-Fontenell Hotel, Omaha, Neb.

22-25 EEI Meter & Service Committee, Hotel Lorraine, Madison, Wis.

23-25 NELPA Business Development Section, Chinook Hotel, Yakima, Wash.

JUNE

6- 7 Public Utilities Association of the Virginias Rural Committee, Cedar Lakes Camp, W. Va.

6- 8 EEI Convention, Atlantic City, N. J.

15-17 NELPA Accounting & Business Practice Section, Benson Hotel, Portland, Ore.

26-
July 1 ASTM 63rd Annual Meeting and Apparatus Exhibit, Chalfonte-Haddon Hall, Atlantic City, N. J.

JULY

21-22 EEI Industrial Relations Committee Joint with the Rocky Mountain Electrical League, Denver Hilton Hotel, Denver, Colo.

SEPTEMBER

7- 9 NELPA 53rd Annual Meeting, Glacier Park Lodge, Glacier, Mont.

15-16 EEI-AGA Accounting Division and Section Organization Meetings, The Pittsburgh Hilton, Pittsburgh, Pa.

15-17 Public Utilities Association of the Virginias 42nd Annual Meeting, White Sulphur Springs, W. Va.

21-23 ASME-AIEE Power Conference, Bellevue-Stratford Hotel, Philadelphia, Pa.

23 Oklahoma Utilities Association Gas Division Meeting, Biltmore Hotel, Oklahoma City, Okla.

26-28 EEI Industrial Relations Committee 13th Annual Round Table Conference, Drake Hotel, Chicago, Ill.

27 ECAP Copy Group Meeting, New Orleans, La.

28-29 PIP Workshop Conference, Royal Orleans Hotel, New Orleans, La.

28-29 Southeastern Electric Exchange Accounting Conference, Tides Hotel, St. Petersburg, Fla.

28-30 Indiana Electric Association 51st Annual Convention, French Lick-Sheraton Hotel, French Lick, Ind.

A report on

USSR ELECTRIC POWER DEVELOPMENTS

1958 — 1959

A DETAILED report on the electric power situation in the Soviet Union—probably the most comprehensive work of its nature ever compiled—has just been published by EEI.

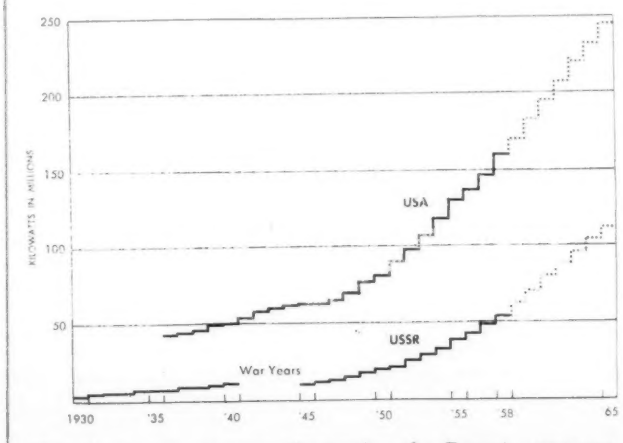
Titled "A Report on USSR Electric Power Developments, 1958-1959," the book is an account of what two groups of American electric industry executives saw and what they were told about electric power developments in the Soviet Union. Both groups toured the USSR under the auspices of the EEI and the Association of Edison Illuminating Companies, as part of a technical and cultural exchange program arranged by the U. S. Department of State and its Russian counterpart.

The first visit was made from Aug. 14 through Aug. 29, 1958, when facilities in European Russia were toured. During the second visit, from July 23 through Aug. 5, 1959, facilities in Siberia, the Urals and Armenia were seen.

Walker L. Cisler, President, The Detroit Edison Co., was appointed leader of both groups by EEI.

The report was announced to the industry and press at a press conference in New York, Feb. 16. At the conference, Mr. Cisler discussed the Russian electric industry (page 36 of this issue of the BULLETIN, and Donald S. Kennedy, Chairman of the Board and President, Oklahomas Gas and Electric Co., and a member of both touring groups, discussed the power industry in the USA and in Russia (page 39 of this issue of the BULLETIN).

Because it is believed the experiences of the delegations will interest a variety of people in the American electric industry, the report has been divided into four parts. The first section consists of a general view of the electric industry in the USSR.



This chart, one of many illustrating the Report, compares total electric capacity patterns in the USA and the USSR.

The second is made up of detailed notes concerning the principal facilities visited. The third part provides a compilation of statistics concerning the Russian electric power industry. The fourth part presents certain industrial forecasts for both the USSR and the United States. These divisions make it possible for those who are interested in a broad picture to avoid a mass of particular observations. At the same time, it puts the more technical observations of the delegates and the statistical material in an easily available form. The 81-page book may be ordered from EEI, 750 Third Ave., New York 22, N. Y., for $1.85 per copy.

Other members of the delegations, in addition to Messrs. Cisler and Kennedy, were as follows:

Harvey E. Bumgardner, Assistant to President, The Detroit Edison Co., and Chairman, EEI Committee on Technical Exchange for Overseas Visitors, both trips; James F. Davenport, Executive Vice President, Southern California Edison Co., both trips; Charles E. Eble, President, Consolidated Edison Co. of N. Y., Inc., last trip; Lewis R. Gaty, Vice President, Research and Development, Philadelphia Electric Co., last trip; Elmer L. Lindseth, President, The Cleveland Electric Illuminating Co., and Chairman, EEI Committee on Atomic Power, first trip; Francis K. McKune, Vice President, Engineering Services, General Electric Co., last trip; Alexander C. Monteith, Vice President and General Manager, Apparatus Products, Westinghouse Electric Corp., last trip; Gwilym A. Price, Chairman of the Board, Westinghouse Electric Corp., first trip; Philip D. Reed, then Chairman, Finance Committee, General Electric Co., now retired, first trip;

(*Continued on page* 49)

A Look at the Russian Electric Industry

By Walker L. Cisler
President, The Detroit Edison Co.

DURING 1958 and 1959 two delegations of American electrical industry executives visited the Soviet Union. Included in the two groups were representatives of electric utility companies, electrical equipment manufacturers and an engineering construction firm. I was privileged to serve with these distinguished gentlemen in heading up both delegations.

Both of our delegations to the Soviet Union were a part of the technical and cultural exchange program arranged by the U. S. State Department and its Russian counterpart. Both delegations traveled under the auspices of the Edison Electric Institute and the Association of Edison Illuminating Companies.

In 1958, the first group toured electric power facilities in European Russia. In 1959, the second delegation visited the Ural region, Siberia and Soviet Armenia. Altogether, we traveled some 20,000 miles within the Soviet Union. We saw steam turbine-generator stations, hydroelectric stations, transmission facilities, atomic power developments, electrical equipment manufacturing plants and various research facilities. We spent time in Moscow with members of the ministry which administers the Soviet electric power industry. We also had discussions with members of GOSPLAN, the central planning agency for the Soviet Union.

I believe that during our talks the Russians were trying sincerely to present the facts about the electric industry in their country. We found the Soviet technical people to be extremely able. They are good engineers and good scientists. But the technical ability of the personnel is not the only question involved in a discussion of the electric power industry in any country. Many other factors must be considered. This is particularly true in a nation with a highly integrated, centrally controlled economy such as the Soviet Union.

Development of Soviet Electric Industry

Electric power plays a vital role in any modern nation. Among other things, it is used to drive most production machinery. As a result, its use often provides a good over-all index of the economic well-being of a country.

The importance of electricity to the progress of the Soviet Union has been emphasized in Russia since the earliest days of the Communist regime. In 1918, five months after the establishment of Soviet power, Lenin proposed that a number of commissions be formed to draw up plans for the complete reorganization of Russian industry. Main attention was to be focused on the electrification of industry and transport, and on the use of electricity in agriculture.

Out of this proposal grew what is known as the GOELRO Plan. GOELRO is the abbreviated Russian name for the State Commission for the Electrification of Russia. This plan served as the prototype for all Soviet attempts at centralized industrial planning. It is the basis of the Soviet power industry today.

The GOELRO Plan, which was approved in 1920, called for the construction of a large number of generating stations and for the establishment of a series of power grids which were gradually to unite the power plants by one high-voltage transmission network. But today there are still 52 different power systems in the USSR, many of which are individual plants. Realization of the plan for a single power grid for the nation is still at some indeterminate time in the future.

During the Stalin era the emphasis of the Soviet electric industry was on the development of hydroelectricity. This should not be surprising. The Soviet Union is about 2½ times the size of the continental United States and has about 2½ times the potential water power resources of this country.

I do not mean to give the impression that Soviet hydroelectricity development is greater, or even comparable, to ours. Actually, production of electricity by hydroelectric sources in this country is about three times as great as that of the Soviet Union. It does seem to be a fact, however, that during the 1920's Russian engineers decided that the substantial water power sources of their country should be put to use. As a result, they began a long-range program of construction of large hydroelectric stations.

The first of these large stations to be built was the Dnieper station which was begun in 1927 and completed in 1939. The latest is the 2,300,000-kilowatt Kuibyshev station on the Volga River which was opened for service in August, 1958. We visited both of these stations, as well as others.

When the Communists came to power in Russia there was almost no hydroelectricity in the country. By 1958,

Presented at conference announcing "A Report on USSR Electric Power Developments, 1958-1959," New York City, Feb. 16, 1960.

about 21 percent of the electricity was being produced in hydroelectric stations.

As I have suggested, the decision to develop hydroelectric energy in the Soviet Union probably began from a sound basis. Once made, however, the decision proved ideally suited to a typical Russian persuasion technique.

By concentrating their efforts, and their investments, on the construction of relatively large hydroelectric stations, the Communists have been able to claim that they have the "biggest" hydroelectric dam in the world. They were saying this about the Dnieper dam in the early '30's. They are saying it about the Kuibyshev dam today.

The decision to emphasize hydroelectric construction was part of a complex pattern which, the Soviet planners hoped, would bring rapid industrialization to all parts of Russia. Closely connected with it was the decision to move large bodies of people to sparsely populated Siberia, which has a large part of the potential water power resources of the country. Another related decision was to concentrate attention on high-voltage transmission, so that the power developed at the far-off hydro sites could be carried to industrial centers.

A Change in Policy

Until the ascent to power of Nikita Khrushchev, Russian power development seems to have followed generally along the lines I have just described. Of course, steam stations were being built, too, but the emphasis of the central authorities was on the development of hydroelectricity.

On August 10, 1958, Mr. Khrushchev announced a change in policy. Ironically, he made his announcement at the dedication of the Kuibyshev hydroelectric station which was being advertised as the "biggest" hydroelectric station in the world. Hydroelectricity, Mr. Khrushchev said, was to be de-emphasized. In the future, stress was to be put on the development of thermal stations.

In his presentation of the Soviet seven-year plan for 1959-1965 a few months later, Mr. Khrushchev fully explained the change in policy. Hydro plants require large amounts of capital investment and long periods of construction time, he pointed out. Emphasis on construction of thermal stations would provide Russia with more electricity in less time and with less capital required.

In other words, Mr. Khrushchev proposed bringing electric power to the people by building thermal stations near the centers where the power was to be used rather than by moving whole cities to distant hydro sites or by building long, costly transmission lines from the hydro sites to the population centers. The pattern he suggested is the one which we have followed in this country for many years.

The shift in emphasis naturally seems to have caused some upset within the Russian electric power industry. For more than a year, the subject has been cautiously debated in the Russian technical press. Last November, I. T. Novikov, Soviet Minister of Power Station Construction, and several of his associates spent a day with Mr. Khrushchev on the Black Sea coast arguing the case for continued emphasis on hydroelectric construction. Mr. Khrushchev seems to have remained unconvinced. At a national conference on power plant construction in Moscow on Nov. 28, 1959, reported in the Dec. 13 issue of *Pravda*, he reiterated the decision to emphasize the construction of steam plants.

Our latest information is that by 1965 the Russians expect the proportion of hydroelectric production to be reduced from 21 percent to about 15 percent.

Use of Electric Power in the USSR

The factors involved in deciding which of several available sources are to be used to produce electricity are many and complex. They touch on political, social and economic questions of the broadest kind. The subject of the ways electric power is to be used in the Soviet Union leads to even more basic aspects of Russian development and aims.

In 1958, about 80 percent of Russian electric production was devoted to industrial and military use. Only about 16 percent went for residential and rural use. The remainder was used for transport.

In other words, the individual consumer in the Soviet Union does not have much electricity available to him. As in most areas of Russian economic life, the main Soviet effort is being put just where it has been put for years: on basic industrial production and on military development. The individual consumer runs a poor third.

The broad outlines of the way the Soviet planners expect their electric industry to develop have been presented in the seven-year plan covering the period from 1959 through 1965. This plan constitutes a revision of a five-year plan that, about a year-and-a-half after it was announced, proved to be highly over-optimistic. For example, the original plan called for production of 230.2 billion kilowatt-hours of electricity in 1957. The actual output was 209.7 billion kwhr, about 9 percent under the goal.

The present seven-year plan seems to set up more reasonable targets for the Soviet economy. The goal for electric power production in 1965, including the amounts to be used within the electric stations themselves, has been announced as 500 to 520 billion kwhr. To reach this level of production, Soviet engineers estimate they will need to reach a capability of 110 to 112 million kw.

Industry and construction will continue to be the major consumers of electricity. The electrochemical and electrometallurgical industries are expected to grow particularly rapidly. Electrification of the Trans-Siberian Railroad is expected to consume large amounts of electric power by 1965.

The present seven-year plan promises that attempts will be made to carry out the process of rural electrification and to put greater emphasis on residential consumption, but it is difficult to see how the Russians can develop quickly the kind of consumer economy needed to bring down the industrial proportion of their electric use. While we have considerable evidence that they would like to do so, we also have considerable evidence that they are finding it a difficult thing to do.

For example, only last November the Communist Party Central Committee issued an appeal to almost every conceivable organization in the Soviet Union to save electric power. The Central Committee strongly

suggested that in every part of the country commissions be set up to "see to it that electric power is utilized economically, expose shortcomings in this matter and work to eliminate them, and when necessary, bring relevant questions to the attention of the proper people." The entire 3,000-word letter appeared on the front pages of both *Pravda* and *Izvestia* for Nov. 26, 1959.

The same day, in a signed article in *Pravda*, I. T. Novikov, the Minister of Power Station Construction, complained that extension of transmission lines was being held up because of a shortage of wire. It seems fair to ask how electricity can be brought to farms if the material needed for transmission lines is unavailable.

I do not want to give the impression that in my opinion the Russians will not meet their goals for 1965 in electric power production. On the contrary, from everything our delegations learned in the Soviet Union, I am ready to assume that the goals will be met.

Reaching the goals for 1965 will not be an easy task for the Russians, however. It is not going to be a matter of simply saying it will be done, and then having it done.

The important thing to remember, it seems to me, is that Russian economic growth during recent years has been spotty. Rocketry has advanced rapidly. But agriculture has presented serious problems. Heavy machinery production has been emphasized, while consumer products have been largely ignored. What it comes down to is this: the Soviet planners have had to make a series of choices and in selected areas they have been highly successful. Where they have decreed growth, there has generally been growth. Sometimes the growth has not been in the quantity ordered, or of the best quality, but it has generally been accomplished.

If the Russian planners are going to meet their goals for 1965 in electric power production, some area of the economy may be forced to suffer at the expense of others. When the final decisions are made, the second-class area may well continue to be the consumer sector of the economy.

Southern California Edison to Erect a 10-Story Building

CONSTRUCTION soon will start in Long Beach, Calif., on a 10-story building to supplement Southern California Edison Co.'s general office in Los Angeles.

The $4,000,000 building will be owned and operated by Edison's wholly-owned subsidiary, Associated Southern Investment Co. The parent organization will occupy approximately 40,000 of the building's 100,000 square feet of office space. The remaining area will be leased to business and professional tenants, including those seeking to locate in Southern California.

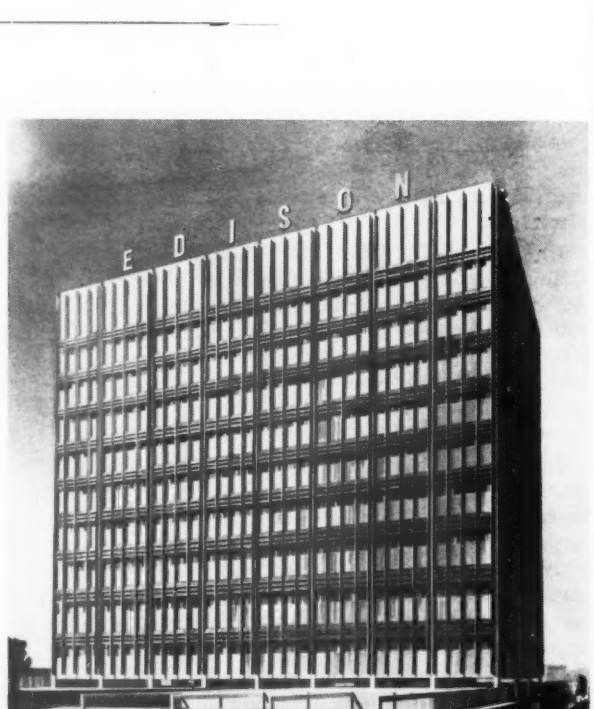
J. K. Horton, California Edison President, said the structure will be a major addition to this important port city's growing skyline. A large neon sign spelling out "Edison" will be placed atop each of the building's four faces and will be visible from the freeway, far out in the harbor and from the beach.

Complete climate control will be provided throughout the building with the use of a modern electric heat pump system. There will be a 150-seat electric living center for demonstrations of new electric appliances and their proper uses. A three-level parking facility will be adjacent to the new Edison building.

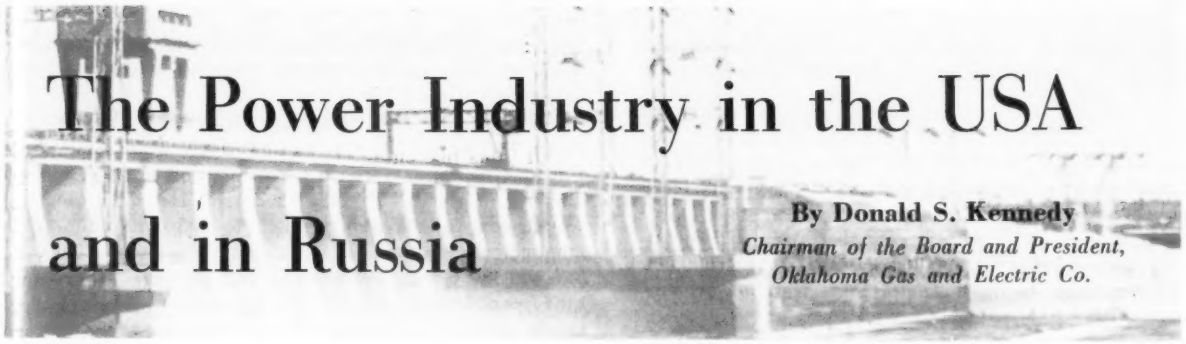
An ultra-modern Honeywell "800" computing system will be installed on the street level. This will be used initially for billing and accounting for approximately 1,000,000 of the utility's 1,600,000 customers. It can be expanded to handle nearly 2,000,000 customer accounts.

To be centrally located in downtown Long Beach, the building will have an entrance court off Long Beach Blvd.

Completion of the building is scheduled for early 1961, Mr. Horton said.



This 10-story building will be erected in Long Beach, Calif., by Southern California Edison Co. as a supplement to the company's general office in Los Angeles.



The Power Industry in the USA and in Russia

By Donald S. Kennedy
Chairman of the Board and President, Oklahoma Gas and Electric Co.

MORE and more frequently these days economists are warning us to be careful in making comparisons between the United States and the Soviet Union. The two economies are really not comparable, they tell us. We are at different stages in our economic development. The patterns and purposes of our lives are different. There are differences in our populations, our labor forces, and our methods of capital investment that are so basic as to be almost impossible to reconcile.

Further, the economists tell us, we must be extremely careful in dealing with Russian statistics. Very often, Russian and American data that seem to be on a similar basis have serious inconsistencies. For example, the electric production figures generally issued by the Soviet Union include amounts used or lost within generating plants. On the average, this includes about 6 percent of the total production. The production figures for the United States exclude this amount. Fortunately, we have enough information about the Russian electric industry now to adjust for this particular discrepancy, but there are other areas where correction is not possible.

Despite these problems, it has become almost impossible to avoid making just the sort of comparisons the economists warn us against. The Russians, of course, have carried this to an extreme. They have set themselves in an all-out economic race with us. Their newspapers and magazines are full of production figures and rates of growth measuring their accomplishments against those of this country.

But the Russians are not the only ones with the idea that economic developments should be described in terms of a grammar-school field day. Many people in the United States are doing the same thing. My own feeling is that the economists are right. Economic growth, whether viewed nationally or internationally, is a good deal more complex than a 100-yard dash and probably should not be discussed in the simplified terms Mr. Khrushchev uses to urge Russian workers on to increased productivity.

The fact remains, however, that, whether we like it or not, comparisons are being made. They are being made all over the world—in Russia, in the United States, and in all the watchful countries in between. In the present context of world affairs, the best we seem able to do is to make sure the comparisons are made as factually as possible, and that the statistics being used are on as similar a basis as possible.

In presenting electric power figures for both Russia and the United States, individual railway and industrial plants producing power for their own use will be included along with the totals for the electric utility industry. The non-utility portion of the U. S. power supply represented about 10 percent of the total capability in 1959. By 1965, it will amount to about 8 percent of the total.

Capability

In 1958, the Soviet Union reported a total generating capability of 53 million kilowatts. That year the capability of the United States was over 167 million kw. The difference between the two was 114 million kw.

In 1959, the Soviet Union had an estimated generating capability of 59 million kw. United States generating capability was 183 million kw for the year. The difference between the two had increased to 124 million kw.

Assuming that the announced Russian goal for 1965 is reached, the total generating capability in the USSR for that year will be 110 to 112 million kw. In 1965, the United States is expected to have a generating capability of 245 million kw. The gap will have widened to about 134 million kw.

In other words, it appears that in 1965 the United States will not only have maintained its present lead in electric power capability, but that the lead will have been increased by some 10 million kw.

Despite the fact that the gap in terms of actual kilowatts of electric power is widening in favor of the U. S., the Russian rate of growth in electric power production, when expressed in terms of percent increase, is greater than ours. There are several reasons for this. For one thing, the Russians are working from a much lower starting point. As a result, their increases appear larger when expressed as percentages. Then, too, the fact that the Russian planners are able to engineer growth in certain sectors of their economy, while ignoring other areas, has an effect on any of the Russian growth rate figures that are released to us. A third factor, as I have mentioned previously, is that our economies are at different stages. At an analogous stage in the development of the electric industry in this country, our growth rate appeared much steeper than it does today.

Percentages are not nearly so important as kilowatts when we compare accomplishments in electric power supply. No matter what the percentages show, the fact remains that during the next six years the United States will be adding more kilowatts of capability than Russia has now. In 1959 alone, while the Russians were adding

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Presented at conference announcing "A Report on USSR Electric Power Developments, 1958-1959," New York City, Feb. 16, 1960.

about 6 million kw of capability, the United States was adding about 15 million kw, or more than twice as much.

Steam, Hydro, Nuclear Power

In steam power development, Russia is operating in high temperatures and pressures, although not quite as high as we are here. Russia's largest units are 200,000 kw, compared to units of some 335,000 kw in this country. Three machines of 500,000 kw and one of 600,000 kw are currently being built for American power suppliers.

The Russian program of hydroelectric construction consists mainly of several very large projects. This has left some observers with the impression that the Russians are threatening our leadership in this field, which hardly seems to be the case. America has about three times the Russian hydroelectric capacity and, while both countries now have about 80 percent of their power facilities in steam and 20 percent in hydro, the Russians expect that by 1965 their ratio will be about 85 percent steam and 15 percent hydro.

In both countries atomic power is still in the research and development stage, although the American program in this area appears to be much broader than that of the USSR. Russia has built and is building five atomic power plants of a total capacity of 565,000 kw. In this country, electric power companies are participating in some 16 projects with a total capacity of 1,400,000 kw that will require an estimated expenditure of more than $570 million. In addition, government-owned or -financed power organizations will participate in the building and operation of three nuclear power plants having a combined capacity of about 110,000 kw and requiring an expenditure by these organizations of about $32 million.

Russia plans no large-scale atomic power development until atomic power can be made more economically. The plants now being constructed and operated are not intended to produce economic power, but to provide more information about the potential of atomic energy. As a result, atomic power can be expected to play only a small part in any growth of Soviet power capacity during the next seven years.

Transmission

Regarding transmission facilities, Russia reported about 46,500 miles of transmission lines of 35,000 volts and above for the year 1957. That year, the United States, with about one-third Russia's area, had 240,000 miles of transmission lines of 35,000 volts and above, more than five times as much as the Soviet Union.

As recently as 1955, Russia was reporting no transmission lines of over 229,000 volts. During the past five years, however, they have developed lines of higher voltages. A 550-mile line from the Kuibyshev hydroelectric project on the Volga River to Moscow is operating at 400,000 volts. Work has begun on converting this line to 500,000 volts and experiments are being carried on with higher voltages, up to 800,000 volts.

There is no comparable situation in the United States. Historically, power development in this country has provided many more plants and placed them at relatively shorter distances from the load centers. As the Russian system has developed, with its large hydro sites far from the load centers, it has become necessary to build lines of much greater length than we would consider economic.

For example, I have already mentioned the line between the Kuibyshev station and Moscow. A comparable line in this country could transport power to New York City from a site 50 miles west of Detroit, Mich. It would cost about $96 million to $110 million. This amount could provide a steam plant of from 680,000 to 780,000 kw which, in terms of our present power capability per person in the U. S., would supply enough electricity for the population of a city the size of San Francisco.

Recently we have had some indications that the Russian engineers now realize that in many cases it would be cheaper for them to build a steam plant near a load center than to construct long transmission lines from far-away power sources. For instance, a new voltage standard of 330,000 volts has been adopted for use in many parts of the Soviet Union. This voltage class, according to a publication of the Ministry of Power Station Construction, will free the Russians from the need to build the more expensive, higher voltage transmission lines.

In the United States, the highest transmission voltage now is 345,000 volts. The next step will be 460,000 or 500,000 volts. A 4½-mile line is now being constructed for experimental transmission at voltages up to 750,000 volts.

The Employee

What is the role of the employee in the Russian electric industry?

Walking through a Soviet electric plant, there are several things one notices almost immediately. First of all, there are more women than we are used to seeing in and around a power station. In fact, about half of the workers in the Russian electric industry are women. Men and women are used for clerical, technical and manual jobs without discrimination. In this country women make up about one-third of the total work force and are mainly office workers.

The second thing one notices about the employees is that there seems to be more of them than we are used to seeing. According to the Russian statistics, the large steam plants in the Soviet Union often require more than four times as many employees per 1000 kw of plant capacity as similar plants here.

I might mention, too, that Russian workers do not live as well as similar workers in this country. I know this is something of a truism. We all have heard that the individual consumer in Russia has received a raw deal. But seeing the workers in their coarse, ill-fitting clothing and watching them go into their dingy, over-crowded living quarters is still something of a shock.

During our travels we sampled salary levels at the various plants we visited. We found that wages are set by the government, and that they can be supplemented through a system of bonuses set up to increase productivity. These bonuses are awarded on a monthly basis for individual and group performances against a pre-set target. They can be awarded to anyone in the plant, from the plant director right on down.

Taking these bonuses into account, along with the fact

that the Russian government sets prices of all goods and services—a means it uses for subsidizing certain areas of consumer use—we found that the average income of the Russian worker is something like one-third the income of the American worker.

Per Capita Use

One good indicator of a nation's total productive capacity and the well-being of its people is the amount of electricity being used per capita. In Russia, in 1959, we estimate that there were 1161 kilowatt-hours per capita. In the United States there were 4481 kwhr per capita. The Russian goal for 1965 is about 2100 kwhr. We attained that rate in 1947. Our forecasts put the per capita use in the United States in 1965 at about 6000 kwhr.

The average home use of electricity in Russia is about 400 kwhr a year. In the United States the average home use in 1959 was about 3550 kwhr.

Last November the Soviet government started a national campaign to save electricity. I understand that before the campaign had been going very long, Oleg Popov, the famous Russian clown, had developed a routine about it. He steps out into the semi-dark circus arena and begins searching for something. He can't find it. He asks for more light. He still can't find whatever he is looking for. He keeps demanding more light until the arena is as bright as day. Finally he leans over and picks something up.

"What did you find, Oleg?" a voice asks.

"Five kopecks," he says.

"Five kopecks? But Oleg, we spent much more than that on the electricity we used to help you find it."

"Aha," says Oleg, "but the five kopecks are mine."

In this country, consumers have always had an ample supply of electricity. We now have a margin of power capability over demand of more than 20 percent.

Price of Electricity

We were not able to gather any detailed information as to the prices of industrial electricity in the Soviet Union. When we asked about this, our hosts explained, in general terms, that the price covers the cost of making the electric power, plus a certain amount of margin. Since the goverment owns both the power plant that is producing the power and the industrial plant that is purchasing it, the price is not of much significance.

We did discover, however, that the price of residential electricity is set at a flat 40 kopecks a kilowatt-hour. At the 10 to one exchange rate, which we found to be the most realistic, this would mean that Russian residential consumers pay the equivalent of four cents a kilowatt-hour. In this country, of course, electric companies follow the practice of providing a sliding scale rate for the use of electricity. The average price of all residential electricity in the United States is about 2.51 cents a kilowatt-hour.

In this discussion of the various phases of the electric industries in Russia and the United States, it should be kept in mind that these comparisons should be handled very carefully. To say that our country has developed some product or some industrial practice which the Russians do not have does not mean, necessarily, that our country is better than theirs. Our product, or our practice, or whatever it is that we are comparing, could be totally inappropriate to Russian conditions. The two economies are at different stages of development and, quite naturally, are growing in different ways.

In any country electricity is produced to meet the demands for it. Although the use of electricity is an excellent index of economic growth and promotion of the use of electricity can contribute to that growth, increasing a nation's capability to produce electric power does not necessarily result in an increase in its Gross National Product. Building power capacity in excess of actual needs will not, of itself, increase the total production of an economic system. Indeed, this may be wasteful of capital and materials that might be better used in other segments of the economy.

In the United States the electric utility companies work hard at selling electricity and promoting its use. At the same time, they are making constant studies of what consumption of electricity will be in the future. In this way the construction of electric power facilities in this country is tailored to the needs of commerce, industry, agriculture and home consumption.

On the basis of these studies, I make two predictions which I have every confidence will be fulfilled. First, and most important, no matter what the Soviet accomplishments in the field of electric power production may be, no matter whether their goals are reached or not, the electric utility industry in this country will continue building the facilities needed to supply the American economy with an ample supply of electric power. The result will be, and this is my second forecast, that the Soviet Union will not catch up with us in the production of electricity at any time in the foreseeable future.

Georgia Power to Give Music Scholarships

YOUNG musicians from throughout Georgia have been invited to compete for seven $350 scholarships to the nationally famous Transylvania Music Camp at Brevard, N. C.

The scholarships are being awarded by the Georgia Power Co. through the Georgia Federation of Music Clubs. The federation will judge the competition and announce winners at its annual convention in Rome, Ga., in April. Winners will attend the 1960 music camp.

A scholarship will be awarded in each of the power company's seven divisions. Students from 12 to 20 are eligible. The competition, however, is open to all Georgia students, including those living in territories not served by the company. Those living outside the territory may compete by sending an application to the chairman of the nearest power company division.

Growth in Electric Power to Serve America

By Allen S. King

President, Edison Electric Institute, and President, Northern States Power Co.

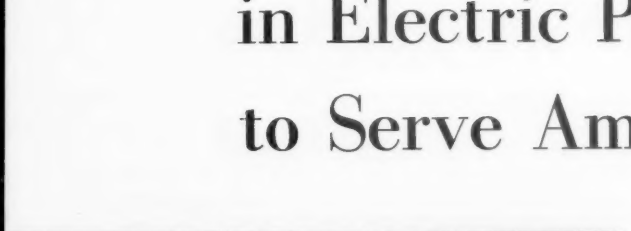


Figure 1

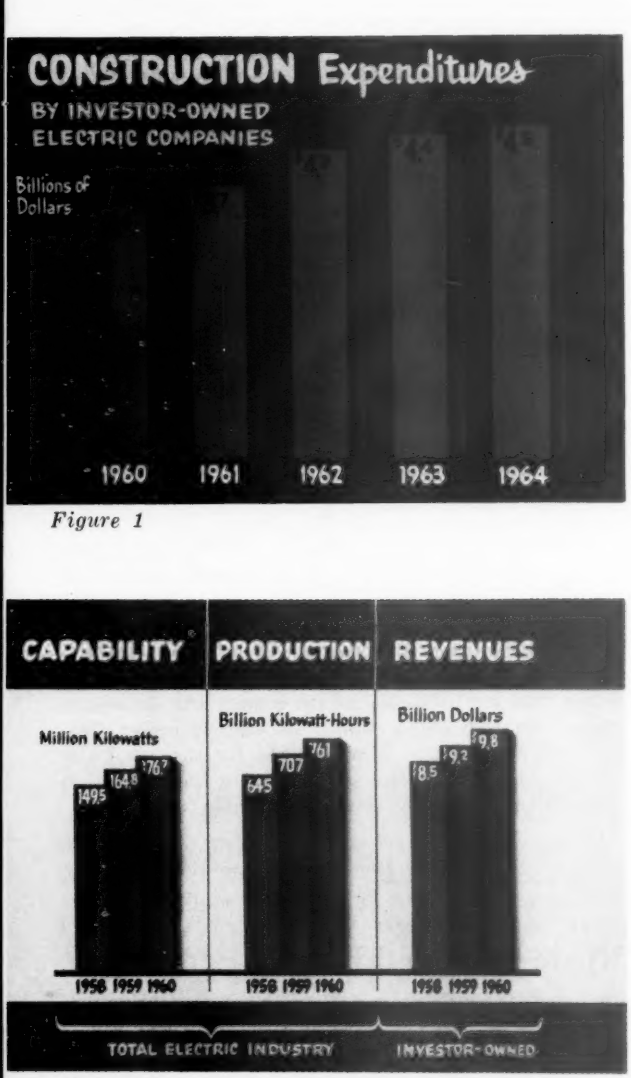


Figure 2

IF I had to select one word to characterize the electric industry's past and future, it would have to be the word "growth." What will that growth be for the near and not-so-near future, and what factors will produce the greater dimensions of the industry?

The electric power industry is a basic "growth" industry. It stimulates over-all economic growth in the United States, and, in turn, it profits from growth in widely diversified segments of the economy. There is scarcely an industry or enterprise of any consequence which is not using more and more applications of electricity to improve its productivity and to assure success in the future. If we take stock of the rapidly proliferating applications of electricity in the home, it is easy to see why we in the industry feel that in the electric power field the potential for growth and progress is greater than it has ever been.

Industry's Growth Has a Free Market Base

We have grown and will continue to grow with the support of the free market. This is hardly a surprising statement, but there is a distressingly large number of people in this nation who tend to equate growth with what the government's expenditures may be in a given field. Our industry has had a free market base ever since Edison developed on risk capital his electric lighting system eight decades ago. His achievement became the foundation of the world's power systems of today.

From its small beginning the investor-owned electric industry in this nation grew until, at the end of last year, it had a total plant investment of more than $46 billion.

As an indication of the way the industry has been growing in recent years, this figure is more than double the investment only nine years ago, at the end of 1950.

What have some of these annual investments been? And what are they likely to be in the future? Let's go back five years, then look forward for a similar span.

Last year, the investor-owned electric companies spent $3.5 billion, their third largest expenditure, on new plant and equipment. Of the total, 54.3 percent, or $1.9 billion, was raised by long-term financing, and the remainder came from internal sources. In 1958, the record

An address before the New York Society of Security Analysts, New York, Jan. 6, 1960.

year, $3,764 million was spent on construction, with 60.5 percent raised by long-term financing. For 1957, the second largest year, the expenditure was $3,679 million, with 67.2 percent in long-term financing. In 1956, the figures were $2,910 million, with 50 percent long-term financing, and in 1955, they were $2,719 million, with 50.3 percent from outside sources.

Figure 1 indicates the way construction expenditures by the investor-owned electric companies will look for the next few years, based on preliminary information.

Our present estimate is that from 55 to 60 percent of each year's total will be raised from outside sources through long-term financing.

Before going further into the future to look at some of the expected dimensions of the electric industry, I would like to touch briefly on the record of the year just ended (Figure 2). Undoubtedly, many of the preliminary figures are still familiar—the fact, for example, that in generating capability the industry reached a new high of 164.8 million kilowatts. This was accomplished with a record increase of 15.3 million kw, or 10.3 percent over the 1958 figure. Of the total increase, 11.8 million kw were on systems of investor-owned electric companies, and the remainder on systems of governmental agencies and cooperatives.

Electricity production by the industry reached a record 707 billion kilowatt-hours, an increase of 62 billion kwhr, or 9.6 percent, over 1958.

Gross revenues of the investor-owned electric companies in 1959 were $9,150 million, 8.2 percent higher than the previous record of $8,454 million set in the recession year of 1958. Net income was $1,670 million in 1959, 9 percent greater than the 1958 figure of $1,532 million.

In 1960, we expect the total generating capability of the entire electric industry to be advanced 7.2 percent over last year, reaching 176.7 million kw. Of the total of 11.9 million kw to be added, the investor-owned companies will install 9.3 million, the governmental agencies and cooperatives, 2.6 million. Electricity production by the industry is expected to be 7.7 percent higher than in 1959, with 1960 generation totaling 761 billion kwhr.

The revenues of the investor-owned electric companies should be about 7 percent greater than last year, reaching about $9.8 billion.

For the further future, here are some predictions for 1970 and 1980, with 1959 results for comparison (Figure 3). The numbers reach a considerable magnitude—but we believe they are sound forecasts.

Total Electric Utility Industry in the U. S.

	1959	1970	1980
Peak load-kilowatts	129.3 million	265 million	501 million
Capability-kilowatts	164.8 "	305 "	576 "

By 1980, new generating equipment will be going on the line at the rate of about 35 million kw a year.

This is the way the industry's generation will look (Figure 4). By 1970, annual production will be 1,481 billion kwhr, and by 1980, it will be 2,795 billion kwhr.

Studies made by the Institute indicate that total annual output of the electric industry will be between 6 trillion and 10 trillion kwhr by the year 2000. What

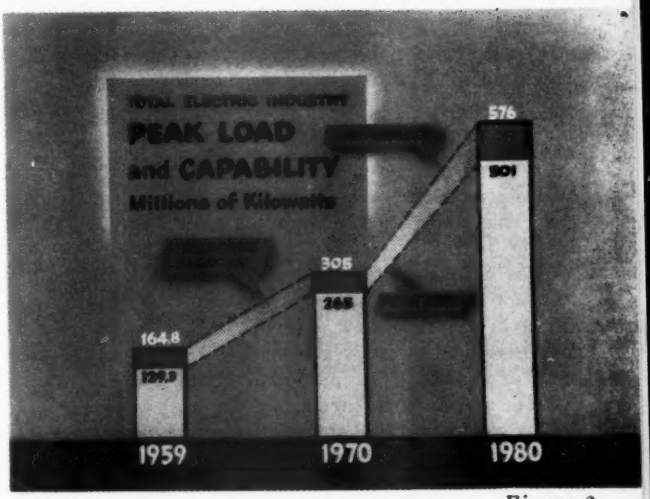


Figure 3

Figure 4

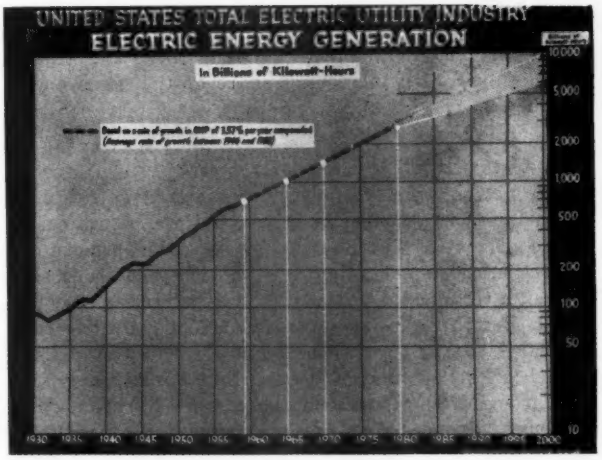
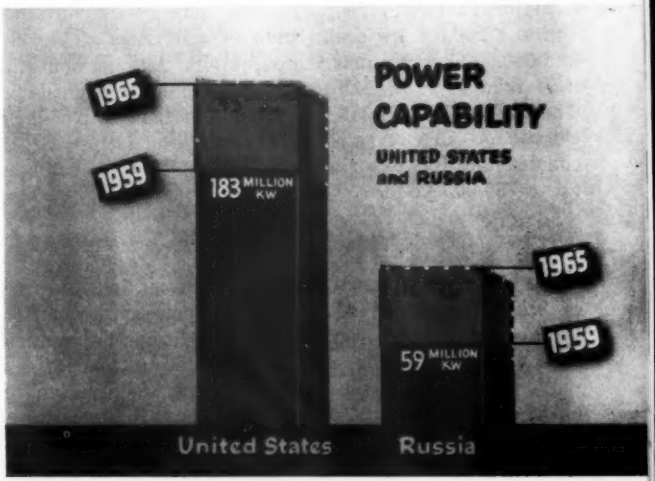


Figure 5



the figure actually turns out to be will depend on the rate of growth of the national economy and the rate at which new energy uses are introduced.

Live Better Electrically

As large as the predictions for the near and far future may seem, there are influences which may make it necessary to revise some of the figures upward in the coming years.

Sales activities, for example, are gaining increasing attention in our industry. One vigorous and growing infant in this field, now entering its second year, is the Live Better Electrically program of EEI. It is the focal point of expanding promotional efforts by both electric utilities and manufacturers.

This year 141 EEI member electric companies are taking part in the Live Better Electrically program, including seven companies participating for the first time. Both General Electric and Westinghouse have announced that each will spend $3 million in advertising that will incorporate the basic selling themes of the Live Better Electrically program. At all levels, including local electric companies, distributors, and dealers, it is expected that some $30 million will be spent this year in activities promoting residential use of electricity. We think that this indicates our industry is aggressively competing for an increasing share of the home energy market.

New Horizons in Technology

We not only plan to be serving many more customers with many more kilowatt-hours, but we plan to do it more efficiently. There are still ways to bring down construction costs and improve efficiency of operation through technical refinements, and these are being pursued. But there are also tremendous opportunities being revealed by various research and development projects which offer new areas for important breakthroughs.

Through higher operating temperatures and pressures, through advanced construction methods, through larger generating units and in other ways, the electric industry is keeping its cost per kilowatt-hour down, despite the inflationary increases in material, fuel, manpower and the other factors which go into the making of electricity.

The steady increase in generator sizes, which has been a major factor in keeping costs down, will continue. Units of 200,000 kw are in wide use and units of 500,000 and 600,000 kw are under construction. Another continuing trend is towards higher voltages in transmission. The highest now is 345,000 volts. The next step will be 460,000 or 500,000 volts. A 4½-mile line is now being constructed for experimental transmission at voltages up to 750,000 volts.

Automation

We are making great strides in automation, an area of wide interest. Without electric power, automation would probably not even be a word, so it can be appreciated why this field is especially significant to us.

We are entering the era of automatic operation of entire electric plants, through the use of electronic computers. This will be an important step in keeping manpower costs down, as the industry's power-making ability continues to rise. The automation system in a pioneering new plant now under construction will start, run and stop the plant while controlling it to meet power demands, and will allow normal operation when the computer is out of service.

Computers are coming into increasing use to control the output of complete systems, involving as many as three dozen generating units. One such automatic dispatch system measures moment-to-moment total use of electricity by 2 million customers, selects the generators which can most economically carry the load, and by remote control, regulates production to meet the demand.

In the accounting and billing functions, electronic data processing systems are taking on more and more of the chores which otherwise would put a growing load on clerical and office personnel.

Versatile computers are also being used to make complex engineering and system studies, and are of great assistance in planning for the most effective and economic expansion of systems to meet future load requirements.

The electric industry is in a unique position regarding automation, because for us it is a two-way growth factor. Applying techniques of automation helps the utility companies in their expansion and in economic production of power, and the increasing application of automation equipment and methods in other businesses builds the sale of electricity.

Breakthrough Concepts in Generation

Along with the advances being made in improving conventional equipment and methods of operation, the industry continues its search for entirely new ways of manufacturing its product.

For example, there was recently announced the success of an experimental laboratory device making use of the principle of magnetohydrodynamics. This involves the passing of an ionized gas through a magnetic field to produce electricity. Ten electric utility companies and a manufacturing company are participating in research and development in this field, which could revolutionize the industry. While the new system may not become practicable and competitive with conventional equipment for from 10 to 30 years, those engaged in the project feel that eventually an MHD system could result in a 25 percent increase in operating efficiency. In an MHD system, much of the "hardware" of a conventional thermal plant, including major portions of the turbine-generator, would be eliminated.

Atomic energy is becoming an increasingly important factor. As you may recall, 131 electric companies are participating in 16 plants, which will have a combined capacity of about 1,400,000 kw. Three of the plants are already in operation. Three more are scheduled to come into operation in 1960, bringing the total of nuclear-fueled capacity to about 490,000 kw by the end of this year.

The day is still years away when atomic power will be competitive with conventional fuels in all areas of the nation. But we are moving steadily towards that goal.

There are various other concepts under study—including solar energy and such direct conversion systems as fuel cells, thermoelectric and thermionic devices. They all indicate the progressive approach which is being

taken to research and development in new methods of producing that most versatile of energy forms—electricity.

Breakthrough Potential in Sales

As befits a forward-looking industry, we do not limit ourselves to the production and operation side in looking for breakthrough possibilities. We have a solid base for advance in the continuing growth of the population, which has been producing more than one million new customers annually—about 90 percent of them residential users. And all of us have become accustomed to what is really rather remarkable—the constant development and public acceptance of new appliances and applications of electricity for the home, farm, industry and commerce.

Important as these factors are in themselves, they may very well be the launching pad for developments of startling magnitude.

For example, perhaps the most spectacular opportunity for a breakthrough in utilization, or sales, lies in electric house heating and climate control, with such applications as humidity control and air filtration, designed to provide a springlike atmosphere in the home all year round. With electric heat, today's average 3500-kwhr home would reach over 22,000 kwhr—about six times the present average.

The potential here is of great interest to the electric industry, with an increasing number of companies stepping up their activities in the field. The heating load is particularly desirable, since it will help to balance the rapidly rising summer air conditioning load, with consequent good results for load factor.

Stability Over the Business Cycle

Lest you think that we are casting ourselves in the role of a volatile missile-age industry, I would like to point out a very important, if less dramatic virtue. This is the industry's remarkable stability over the business cycle.

Its most striking demonstration recently was during the 1958 recession—a year in which the electric companies invested a record $3.8 billion in new plant and equipment, 12½ percent or one-eighth of the investment made by all American industry during that year. And revenue and net income of the investor-owned electric industry continued its rise, while corporate profits of all industry dropped.

The strong position held by residential customers in consumption of electricity tends to reduce the effects of industrial cut-backs during recession periods. A demonstration of this is indicated in a look at domestic kilowatt-hour sales over the three recessions since World War II. The state of business seems to have little effect on people buying electricity for their home use; indeed sales tend to keep on increasing during business declines.

Of course, this does not mean that domestic sales would not be hit along with other classes of service by a really prolonged and deep business decline. However, we do have in residential sales an unusual built-in stabilizer. And home use of electricity has been growing in importance compared with the other classifications.

A decade ago in 1949, residential kilowatt-hour sales were about 23½ percent of all electricity sales, and made up about 37 percent of revenues. In 1959, the residential category accounted for about 27½ percent of total sales, and about 41 percent of revenues.

With its inherent stability, the electric industry makes contributions to the national economy above and beyond the power it supplies. Its stability helps keep employment steady during economic dips. The industry helps maintain purchasing power both through wages paid by the utilities themselves and through continued construction expenditures.

These are benefits to the economic well-being of all Americans.

Rate Increases and Inflation

There are, unfortunately, some adverse factors affecting earnings of utility companies. Perhaps the best known of these is inflation, although it is not yet well enough understood by most people.

We have been attacking the inroads of inflation in our industry by constantly working towards increased efficiency of operation and through new avenues of selling. These endeavors have been effective over the past years and are primary factors in our future. But the companies frequently have needed more immediate relief in the form of rate increases.

The regulatory commissions continue to recognize the effects of inflation in practically all aspects of operational and capital costs and the necessity for the financial strength essential to the provision of adequate electric service.

From 1946 through 1959, according to tabulations of EEI, there were 578 applications for rate increases involving 223 companies. Of the 578 applications, 517 were granted, 26 are pending, 13 were withdrawn and 22 denied. The 1959 record shows 49 actions. Thirty-three increases were granted, one was denied, and 15 of the 1959 applications are still pending, the EEI records show.

The Tax Picture

It will surprise no one that the investor-owned electric companies continue as a prime source of tax money. Anticipated payments for 1959 amount to $2,120 million going to all levels of government, Federal, state and local. This figure is $157 million greater than the tax bill for the preceding year.

As the companies' largest single item of expense, the 1959 tax bill was equivalent to 23.2 cents out of each dollar of gross revenue. Federal taxes took 58 percent, while state and local accounted for 42 percent of this 23.2 cents.

The tax figures apply only to the investor-owned electric companies, which serve about 80 percent of the nation's consumers. Governmental power operations pay no Federal income taxes and in most cases little or no state or local taxes.

Four out of five of America's electric customers get their power from electric companies—and make sub-

stantial contributions to the burden of government through the taxes which must be included in their electric bills. It is gravely ironic, and highly inequitable, that the fifth electricity user—the customer of government-owned or financed power projects—pays nothing like his equitable share of the cost of government through his electric bill.

Inequity Heightened

This inequity is heightened by the fact that the taxes of electric company customers help make possible government spending on more government power projects. And government power projects are being pushed, despite the fact that the investor-owned electric companies have consistently shown through their performance in the past and their planning to meet future needs that there is no necessity for government to be in the power field.

Unnecessary government spending is a widely recognized basic cause of inflation, a problem which is becoming of increasing concern to more and more people as they realize that inflation saps the economic well-being of those who can least afford it. The unnecessary spending going on and projected in the government power field is one area in which a strong blow against inflation could be struck—saving millions of dollars of taxpayers' money for more useful purposes.

Threat of Government Power—and Russia

The idea of government regulation of such enterprises as electric companies has long been accepted as a sound means of assuring fair treatment of customers, investors and those employed by the company. However, there is a vast difference between regulation and government operation and control.

We are working towards our future with determination and anticipation, but we are aware of the shadow of government power, which has been attempting a total eclipse of the investor-owned power business for more than 25 years now.

This shadow is put into sharp focus by the competition which seems to be developing between Russia and the United States. Government owns and operates all business in Russia and all people work for government. The nature of the two societies in competition should help clarify for the American people what the choice is in electric power—and what it could easily be for the whole economy.

Two Courses

Should the power business be financed by individuals and groups free to invest or not to invest in the business, with ownership and control in the hands of investors operating under government regulation? Or should it be financed by Federal government expenditures and owned and controlled by the government?

If the second way were chosen, a highly significant portion of our economy would then be patterned on the Russian system. Would government ownership of the power business then lead to government ownership of railroads, coal, oil, steel, banks—and what other industries?

With the demonstrated ability of the free market to make possible the long-standing leadership of America in electric power, why should there be any government spending on power projects?

There is no reason in economics or in the power supply situation. We have now a 22 percent margin of reserve generating capability over the estimated annual non-coincident demand.

Since there is no sound reason, those who seek the eventual nationalization of electricity in the United States use various rationalizations, however distorted, to advance their ends. With widespread public interest in economic competition with Russia, they have not surprisingly looked to Russia as basis for their advocacy of this nationalization.

Our Lead Certain

After two on-the-spot inspections by experts of our industry of Russian power facilities, and careful study of available material, I am assured that there is not the slightest reason to believe that Russia will pass the United States in power supply at any time in the foreseeable future.

In reaching this conclusion, we have not downgraded the Russians' ability or determination to expand their power system. On the contrary, we assume that they will achieve the goals they have set for power in their Seven-Year Plan to 1965. For the United States, we have used long-established trends and present plans (Figure 5).

Power Capability—Kilowatts

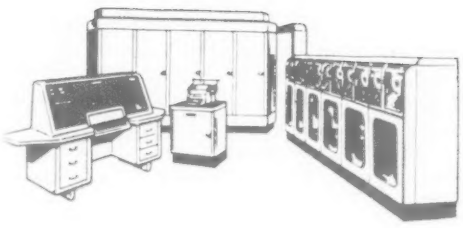
	1959	1965
United States	183 million	245 million
Russia	59 " (est)	110-112 " (goal)
U. S. Lead	124 million	135-133 million

At the end of 1958, the Russians had 53 million kw, the United States more than 167 million. While the U. S. was adding about 15 million kw during 1959, the Russians were adding less than half as much—about 6 million. (U. S. and Russian figures include, in addition to total electric utility industry, individual railway and industrial plants which are producing power for their own use.)

Basically, the issue is *not* that of two great nations striving for pre-eminence in the world. It is a struggle of two types of civilization, and all of us as Americans must remember that—keep it crystal-clear in our minds. One system is based on human liberty; the other on government domination.

If we as a nation were to adopt in any field—in the power business or any other—philosophies and practices of government control that are typical of the Russian system, we would destroy the characteristics of freedom and initiative which have brought us our world leadership and which continue to make it possible for us to keep that leadership.

We would then lose the human values of our own system in attempting to meet the international competition with Russia on its terms.



Electronics Seminar Stresses Importance of Computers

ELECTRONIC computers are playing an expanding and important part in public utility operations, it was emphasized at the Seventh Annual Public Utility Electronics Seminar, held in San Francisco, Nov. 30-Dec. 2.

It was also noted at the seminar that many card system users are considering tape equipment, and well-established tape system users are mechanizing additional applications and are planning to install second generation computer equipment (replacing a computer which has become obsolescent with a newer model). Representatives of companies using computers pointed out that in addition to the economic gains made possible by this equipment, there has been noted a substantial increase in accuracy of the accounting procedures involved.

The seminar was sponsored by the EEI Accounting Division and the American Gas Association Accounting Section in cooperation with the Pacific Coast Gas Association and the Pacific Coast Electrical Association.

P. R. Lawson, of Pennsylvania Electric Co., Chairman of the EEI Accounting Division, said that 168 representatives of 62 utilities and manufacturers attended the seminar. They were from 23 states, Canada and Mexico.

R. E. Harbaugh of the Philadelphia Electric Co., Chairman of the EEI Electronic Accounting Machine Developments Committee, and John Towle of Columbia Gas System Service Corp., Chairman of the corresponding committee of AGA, conducted the seminar.

At the opening session on Monday, Dec. 2, L. W. Coughlin of Pacific Gas and Electric Co. welcomed the delegates. J. Gordon Ross of Rochester Gas and Electric Corp., Past Chairman of the AGA Accounting Section, opened the seminar. He stressed the importance of maintaining good customer relations in every computer installation project.

The general sessions on Monday were devoted to a presentation of new hardware developments by members of the Electronics Committee who maintain liaison with various equipment manufacturers. The equipment reviewed included second generation computers, character sensing machines and other input-output devices. The morning session covered developments at Addressograph-Multigraph, presented by C. D. Otcasek; Burroughs-Electrodata, by J. W. Vanier; Datamatic, by F. F. Beisel; Farrington-IMR, by J. A. Hogg; General Electric, by D. Stoner, and Philco, by E. D. Cowles. J. W. Balet of Consolidated Edison Co. of New York, Inc., completed the morning session by showing the company's training film on "Modernized Electronic Accounting" and discussing the history of data processing in Consolidated Edison.

The afternoon session covered further equipment innovations. J. A. Comerford reported on developments at International Business Machines; C. Marchyshyn discussed National Cash Register; H. E. Steiner reviewed RCA; R. Van Wuyckhuyse discussed Recordak; R. E. Ellifritz reported on Remington Rand, and W. J. Ott covered Standard Register. The afternoon session was concluded with another electronic training film entitled "Your Service Bill," presented by J. P. Bromley of Consumers Power Co.

Tuesday's sessions were divided into six informal panel discussions. By having two groups of three panels each in the morning and by repeating the panels in the afternoon, it was possible for each delegate to attend four of the six meetings. The first was on "Systems Survey and Design Prior to Programming." The panel included Dexter Stoner of Pacific Gas and Electric Co., R. E. Hanington of Philadelphia Electric Co., D. P. Landry of Pacific Power and Light Co., R. C. McCollum of The Peoples Gas Light and Coke Co., and the moderator, R. E. Ellifritz of Columbus and Southern Ohio Electric Co. They reviewed the subject from the standpoint of both actual and potential users. In another panel, E. D. Cowles of The Detroit Edison Co., C. J. Williams of Niagara Mohawk Power Corp., L. C. Hughes of Pacific Gas and Electric Co., C. Marchyshyn of West Penn Power Co., and the moderator, J. S. Burchell of New Jersey Power and Light Co., discussed "Information Transfer and Re-entry Techniques" as applied in their respective companies.

"Data Processing in Medium-Size Companies" was presented by a panel composed of J. A. Hogg of Atlantic City Electric Co., D. Essig of Citizens Gas and Coke Utility, M. G. Meadows of Laclede Gas Co., W. C. DeNeane of Washington Gas Light Co., and the moderator, J. G. Cadby of Wisconsin Electric Power Co. F. F. Beisel of Pennsylvania Power and Light Co. moderated a panel on "Organization and Administration of EDP." The panel members were W. J. Ott of The Cincinnati Gas and Electric Co., J. A. Comerford of the Consolidated Edison Co. of New York, Inc., H. E. Steiner of Niagara Mohawk Power Corp. and J. W. Vanier of Southern California Gas Co.

"Techniques for Reducing Programming Effort" was

(*Continued on page* 56)

'Sell Electric All the Way' to Be Theme of EEI Sales Conference

MORE than 1,000 top-level sales executives of the electric power industry are expected to attend the Institute's 26th Annual Sales Conference, E. O. George, Chairman of the EEI Sales Division Executive Committee and Vice President of The Detroit Edison Co., has announced.

This year's conference will be held April 4 through 6 at the Edgewater Beach Hotel, Chicago. The theme is "Sell Electric All the Way." The general sessions, on Tuesday and Wednesday mornings, April 5 and 6, will feature addresses by outstanding leaders in the electrical industry and allied fields.

Sales Promotion Awards

Tuesday's general session program will be followed by the EEI Sales Promotion Awards luncheon. Outstanding sales promotion programs in the commercial, farm, industrial and residential markets by electric utility companies will be recognized. The conference will conclude with a general luncheon on Wednesday, with Ed McFaul as the guest speaker. His speech will be titled "How's Your Sense of Humor?"

Principal speakers at the general sessions, at which Mr. George will preside, will include Allen S. King, EEI President and President of the Northern States Power Co., who plans to discuss "Our Industry." Other addresses on Tuesday will include "How Do You Rate?" by G. C. Rawls, President, Louisiana Power & Light Co.; "The 1961 Live Better Electrically Program," by Ralph Zeuthen, EEI Live Better Electrically Program Manager, and "Advertising and Motivation Research," by Dr. Virginia Miles, Vice President, McCann-Marschalk Division, McCann-Erickson, Inc.

The theme of Wednesday's general session will be the "All-Electric Concept." C. M. Wallace, Jr., Vice President, Georgia Power Co., will deliver the opening remarks. The all-electric concept of the architect will be discussed by a senior student at the University of Notre Dame, Richard W. Quinn, who will be introduced by Prof. Francesco Montana, head of the university's architectural engineering department.

Arthur Sworn Goldman, Director of Marketing, *House and Home* magazine, will talk about the builder's viewpoint on the all-electric concept. Discussion of the subject will be concluded with the manufacturer's viewpoint, as seen by Fred J. Borch, Vice President and Group Executive, Consumers Products, General Electric Co.

The conference will open on Monday, April 4, with meetings of EEI Sales Division Committees. Market group meetings are scheduled for Tuesday afternoon.

The Commercial Group, with L. T. Cale, Manager, Commercial Sales of Alabama Power Co., and Chairman of the group, presiding, will meet in the South Terrace.

"Heating Snowballs in Georgia," the story of electric heating in large commercial buildings, will be the subject of the address by Joe B. Browder, General Sales Manager and Assistant to the Vice President in Charge of Sales, Georgia Power Co.

E. O. George, Vice President, The Detroit Edison Co., and Chairman, EEI Sales Division Executive Committee, plans to discuss "Marketing Leadership." He will relate the role of the electric utility industry in providing leadership in the sales of commercial electric cooking equipment to the food service industry, the fourth largest industry in the nation.

"Lighting the Way to Good Public Relations," an address by A. V. Hartl, Executive Vice President, Otter Tail Power Co., is expected to point out how good street lighting can give a boost to the electric utility's public relations program.

The new higher levels of illumination and how they can be sold will be the theme of the speech to be presented by H. E. D'Andrade, a representative of General Electric Co.

Farm Group Meeting

The Farm Group will meet in the West Lounge, with P. R. Schepers, General Farm Service Supervisor, Consumers Power Co., and Chairman of the EEI Farm Group, presiding.

W. R. Poole, Vice President in Charge of Sales, The Toledo Edison Co., will be the first speaker on this program. His speech, "Farm Programs Which Meet the Challenge," is expected to point out the type of farm programs which sell more kilowatt-hours to farm customers in the service areas of investor-owned electric utilities.

Roy Bainer, Chairman, Agricultural Engineering Department, and Assistant Dean of Agricultural Engineering, University of California, will discuss "Current Needs of Research in Farm Electrification."

"Public Relations as Developed Through Youth Programs" is the title of the speech to be presented by W. L. Byrne, Assistant Manager of Sales, Marketing and Public Relations Section, Ebasco Services Inc.

As the last speaker of this session, W. J. Ridout, Jr., General Manager and Editorial Director, *Electricity on the Farm* magazine, will speak on "Successful Farm Sales Programs." A panel discussion on successful farm programs will follow.

Paul W. McCormick, Industrial Sales Manager, Union Electric Co., and Chairman, EEI Industrial Power and Heating Group, will preside at the session of this group in the East Lounge.

In "Bulletin from the Front," C. N. Williams, Research Director, Ebasco Services Inc., will present the current status and future plans of the various government agencies in the electric power business.

"The Dam Story," by Gordon F. De Foe, Commercial Sales Manager, The Washington Water Power Co., will be the next presentation. This includes a 25-minute film produced by WWP to show their employees and certain customers some of the reasons why investor-owned electric companies should develop the hydro potential of their areas.

Arthur C. Barr, Manager, Application Engineering, Large Lamp Department, General Electric Co., will discuss "The Impact of the New Lighting Levels on Cooling and Heating Needs."

James F. Whitehead, Jr., Executive Vice President, Daybrite Lighting, Inc., will close the session with a speech entitled "Selling Industry Its Biggest Bargain." Mr. Whitehead believes the industrial use of electricity will reach unprecedented levels in the 1960's. He will discuss ways and means of insuring that these expectations are fulfilled.

R. G. MacDonald, Vice President, Marketing, West Penn Power Co., and Chairman, EEI Residential Group, will preside at the Residential Group session, which will have the theme "What's Going On?"

Purchasing and Stores Meeting Planned May 2-4

"PROGRESS Through Performance" is the theme of the program being planned for the 13th annual meeting of the EEI Purchasing and Stores Committee, May 2-4, at the Warwick Hotel in Philadelphia. Some of the subjects to be presented on stores include the following:

Training Stores' Employees

"Stores Employee Training Program," a proposed study of methods used by various companies in training employees and of finding out to what extent specialized and completed training benefited their stores operations.

"Trends in Inventory Procedures," a report on physical and other aspects of inventorying, including procedural changes and their effects.

"Stores Performance Measurements," covering material and ways to measure stores performance.

Purchasing subjects will include the following:

"Organization for Effective Purchasing," which will point out approximate manpower requirements in various-sized companies for adequate utility purchasing with, perhaps, some pattern of the relationship of the requirements of clerical help to management personnel.

"Application of Open-End Purchase Orders," which will consider the items of purchase involved, and the extent to which this type of orders are used by others, including the approximate dollar value of purchasing accomplished this way. How the resale of obsolete or excess stocks should be accomplished and the methods used by various companies will be discussed in "Disposal of Surplus and Obsolete Material."

The program will also include a discussion by a guest speaker from a firm of public auditors. His subject will be "Computer Applications in Purchasing and Stores." The speaker will discuss the types of machines which are being used and how they are being used in purchasing and stores functions. Technical details of the machines, as well as actual reports which may be developed from them, will be included in the talk.

These subjects are of increasing importance in the administration and management of purchasing and stores and, therefore, are timely and significant in leading to more effective operating benefits. The subjects were selected to strike at the core of those functions on which there are now large costs or where new techniques offer opportunities for added efficiencies and cost reductions.

The address of welcome will be made by H. N. Ramsey, Executive Vice President, Philadelphia Electric Co.

W. H. Jones, Vice President of Purchasing and Service Operations Department, Philadelphia Electric, will address the Monday luncheon session. His subject will be emergency procedures as they affect purchasing and stores.

Atomic Station To Be Discussed

The Peach Bottom atomic power station will be discussed at the Tuesday luncheon by L. R. Gaty, Vice President of the Research and Development Department, Philadelphia Electric Co.

The Wednesday program will offer a choice of locations to visit: the new generating station of Philadelphia Electric at Eddystone or the company's Plymouth Meeting Service Building and Operating Center.

The annual meeting will include the dinner session on Monday evening and, for the ladies, a luncheon and tour are being arranged for on Monday.

USSR Electric Power Developments

(*Continued from page* 35)

R. G. Rincliffe, President, Philadelphia Electric Co., and President, AEIC, first trip; Joseph L. Singleton, Senior Vice President, Allis-Chalmers Manufacturing Co., and then President, National Electrical Manufacturers Association, first trip; Edwin Vennard, Vice President and Managing Director, EEI, both trips, and J. Perry Yates, Executive Vice President, Bechtel Corp., last trip.

Miss Judith E. O'Flaherty, left, Home Service Director, Philadelphia Electric Co., accepts a 1959 Laura McCall Award from Miss Elizabeth Sweeney Herbert of *McCall's* magazine at the 1960 Live Better Electrically Women's Conference in Chicago. Similar awards for outstanding service were presented also to the four home service personnel at right.

Miss Nora Steg
Kansas Gas and Electric Co.

Miss Ethel F. Lord
Jersey Central P&L-New Jersey P&L

Mrs. Erma M. Boyen
Hawaiian Electric Co.

Miss Dorothy Mims
Florida Power & Light Co.

LBE Women's Conference Views 1960's as Total Electric Living Era

THE 1960's will be the era of total electric living—an era during which electric house heating will come of age—some 300 women interested in the electric industry were told at the Fourth Live Better Electrically Women's Conference in Chicago last month.

Under the theme, "Progress Is Our Future," the conference, attended by many of the nation's leading editors, electrical manufacturers, university teachers and home service women of electric utility companies, reviewed the residential electric situation today and discussed the potential for the incoming decade. The conference was held at the Edgewater Beach Hotel, Jan. 7-9, sponsored by the EEI Home Service Committee, which is under the Chairmanship of Miss Judith E. O'Flaherty, Home Service Director of Philadelphia Electric Co.

In her opening remarks, Frances Maness, Home Service Director of Virginia Electric & Power Co., and Program Chairman, said electric house heating in the 1960's will be the top consumer commodity heading the nation's marketing statistical list.

Miss Maness referred to a report recently released by the U. S. Government Federal Reserve Board which listed the fastest growing products in the past 12 years as home cooling equipment, television sets, clothes dryers and boats. Fifth on the list, she pointed out, was residential electricity. At the end of this decade, she stated, the total electric home may well emerge at the head of the list, largely because of the tremendous increase in consumer demand.

R. G. MacDonald, Vice President-Marketing, West Penn Power Co., and Chairman of the EEI Residential Group, said that nationally residential customers have grown so rapidly that two out of five of the customers served today have been added since World War II.

"This means that we have become barely acquainted with this large and vigorous segment of our residential customer group," Mr. MacDonald said. He added that home service representatives have been working on these newcomers, because they are in the best position to help the customers to a higher standard of living by making

them aware of what real electrical living would do for them.

Mr. MacDonald cited these postwar accomplishments:

- Seventy-five percent of the ranges and 85 percent of the water heaters have been sold and installed since 1946.
- Nearly 100 percent of the dryers, television sets, automatic washers, dishwashers and house heating installations in use today are postwar items.
- About 70 percent of the residential revenue—about $7 out of each $10—received today reflects the results of postwar performances.

He told the home service directors that "since your progress has been so striking, since you have done and are doing such an excellent selling job, why can't we let it go at that?

"The answer is simple. You are in a dynamic growth business. There are many forecasts of this rate of growth from authoritative sources and they all vary. The figure has not jelled, but suppose it comes out somewhere near 8,000 kilowatt-hours per customer annually by 1975? If we accept this figure, which I am sure is definitely on the low side, what we looked at in reviewing our postwar performance was good. But, viewed in terms of the years ahead, it is not nearly good enough."

The Future Electric Company

Mr. MacDonald described the hypothetical Future Electric Co. as one which will have to make considerable progress today—and every day—if it is to have a satisfactory future.

"In other words," he said, "in the prevailing highly competitive atmosphere, it is going to have to make sales."

He predicted that the Future Electric Co. could have the following saturations by 1975: dryer 30 percent, range 80 percent, water heater 50 percent, freezer 25 percent.

"But these items, coupled with all of today's other uses, would give it only 6,000 kwhr per customer annually," Mr. MacDonald said. "This figure is far too low. Too low, because if your company is at that point by 1975 it will suffer by comparison. Too low, because if we stop there it will be because we are being outsold. Too low, because this would not reflect total electric living on the part of enough customers. Too low, because we have not played hard enough to substantially outscore our competitors."

Mr. MacDonald suggested that more and more attention be given to goods and services that take the customers farther and farther in the direction of total electric living. "Most of us feel that today indoor climate control—heating and cooling—is the immediate key to progress. Utopia is not too much to ask for. Why shouldn't we try for the whole job instead of just a few items?"

Stressing the importance of the home service women to the future of the electric companies, Mr. MacDonald said, "It seems perfectly natural for you to paint the picture of total electric living so vividly that customers will not only begin to accept it—they will demand it. Actually, very little is holding us back."

Dr. J. F. Downie Smith, Vice President, Carrier Corp., told the conference that the fundamentals of air conditioning are not understood by most people, including many who have had exeprience with it. To the average person, air conditioning means the cooling of air in hot or humid weather, he said. "But this is merely a small part of the field of air conditioning. Just think of the words 'air conditioning.' They really mean the conditioning of air. And the conditioning of air involves possible changes in humidity, either by increasing or decreasing the water content, or by heating, or cooling, or air purification, or ionization, or the elimination of pollen where desired—and today we can even talk about removal of odors."

Dr. Smith pointed out that one out of every 10 new homes that are built today is completely air conditioned. Last year about 200,000 units were installed. He said that eight years ago only one of 70 new homes that were built was completely air conditioned. In addition, many of the older residences are being equipped each year with air conditioning, he added.

1970's Seen as Leisure Age Courtesy of Electricity

WITH the total electric home coming of age in the 1960's, it has been computed that the homemaker by 1970 can save 2,000 hours of work annually, or approximately five hours a day with total electric living. This estimate was made at the Live Better Electrically Women's Conference by Ralph Zeuthen, manager of the EEI Live Better Electrically program.

These hours represent precious time and money when compared to the average working day per week, Mr. Zeuthen noted. He added that the American homemaker will be primarily responsible for producing these extra hours of free time she is to gain.

Citing research statistics, he said the homemaker initiates 90 percent of all purchases in the home. She is responsible for 85 percent of the shopping traffic in all stores. She is the "thinking," "shrewd," "brave" buyer for the home, as well as the "prideful" possessor of her electrical purchases. Of all the electrical appliances, she is most proud of the electric range, Mr. Zeuthen noted. She also buys luxury items, for practical use in the home—unlike her husband who purchases luxury for luxury purposes.

By living electrically, the homemaker will win as much free time as she spent in the past in taking care of the chores of her family, Mr. Zeuthen told the conference. He predicted that the woman of the 1970's will be as different from the woman of today as the woman of the Victorian era was from the flapper of the 1920's. Electric living in the home will be the largest contributing factor to that change, he added. The American homemaker by 1979 will probably look 10 to 15 years younger than she actually is, will probably speak more than one language, possibly drive an electric car and certainly be more interested in geography and outer space than gardening. She also will be a tutor and teacher to her children, as well as a more conscientious parent, Mr. Zeuthen said.

R. G. MacDonald, center, Vice President-Marketing, West Penn Power Co., and Chairman of the EEI Residential Group, relaxes with other electric utility company executives at the Live Better Electrically Women's Conference. At left is C. E. Anderson, the Virginia Electric and Power Co., and at right is J. H. K. Shannahan, American Electric Power Service Corp. Mr. MacDonald and Mr. Shannahan were speakers at the conference, in Chicago, Jan. 7-9.

The advantages of central air conditioning over room air conditioning were pointed out by William L. McGrath, Chief Engineer, Unitary Equipment Division, Carrier Corp. Of all the advantages, he said, greater comfort throughout the house is the most important.

"Temperature and humidity will be more uniform with adequate circulation of conditioned air throughout all rooms," he told the conference. "This advantage is not limited to the summer season. A home in which central air conditioning is installed will probably have much better heating."

Quietness and appearance are other factors, Mr. McGrath said, which give central air conditioning an advantage.

"With the introduction of new equipment, it is now possible to remove odors and provide constant efficiency air cleansing without even the requirement of changing or cleaning filters," he asserted.

Frances Armin, Director of the Residential Program of the National Wiring Bureau, spoke of the expansion of electric power needs. She forecast that within the next few years wiring adequacy standards will require that every room in the house have electricity capacity which is at least equal to that now required in the kitchen.

The tremendous and increasing growth of electricity to run the home was also stressed by Dr. Naomi G. Albanese, Dean of Home Economics, Womens College of the University of North Carolina. She pointed out that 92 percent of today's homes have refrigerators; 74 percent have televisions and 62 percent have vacuum cleaners.

Electrical products, she added, are graduating into the grouping of necessary items. She said an estimated population increase of 38 million people in the decade just starting will expand both electrical supply and demand.

New approaches in lighting, which pioneered the use of electric power in the first place, were discussed by J. H. Jensen, Director of the Academy of Lighting Arts of General Electric Co. Today's light, he said, is a building element, its purpose not merely to illuminate but to color and decorate, as well as to generate the mood of the home.

The 1960 decade was termed the "space heating age" by J. H. K. Shannahan, Assistant Vice President of American Electric Power Service Corp.

He said John Q. Public seems to want electric heating and has been ahead, electrically speaking, in knowing what he wants as evidenced by the rapid growth of air conditioning.

The electric industry started to sell the joys of electric living piece by piece, Mr. Shannahan told the group. First there was the flat iron, then the washer, then the refrigerator. It was a big step toward all-electric living, he asserted, when the service man replaced the iceman, and ever since, the industry has continued working toward all-electric living, an appliance at a time.

He declared that the industry did not start out to sell all-electric homes, but "suddenly it dawned on someone that we were getting pretty close to living better electrically."

There are more than 40,000,000 kitchens inadequately planned, Virginia T. Habeeb, Equipment Editor of *The American Home* magazine told the conference. She listed these criticisms of American kitchens: poor arrangement,

work areas widely separated, counter space sparse and good storage eliminated, inadequate wiring and lack of convenience outlets and outdated appliances.

"I believe this does prove basically what your job and mine really is when it comes to kitchen planning," she said. "The ladies we are working with . . . do not see their dream kitchen first as an L-shape, a U-shape or a two-wall kitchen, but rather in individual areas that solve the problems they have been living with in outdated kitchens."

Five women in the home service departments of the nation's investor-owned electric utilities were awarded Laura McCall Awards at the LBE Women's Conference for home service achievement. Elizabeth Sweeney Herbert, Household Equipment Editor of *McCall's* magazine, sponsor of the awards, presented a bronze plaque and $200 to each of the winners.

The 1959 Laura McCall Award winners were:

- Miss Judith E. O'Flaherty, Home Service Director, Philadelphia Electric Co., and Chairman, EEI Home Service Committee, for her overall program of home service activities coordinated to meet the needs and interests of customers in the 2,340-square mile area served by Philadelphia Electric. Miss O'Flaherty was a winner last year of her first Laura McCall Award.
- Miss Nora Steg, Home Service Consultant, Kansas Gas and Electric Co., for her special series of "Golden Anniversary Demonstrations of a Wonderful Way to Live," illustrating the advantages of a total electric home. This is Miss Steg's second award.
- Mrs. Erma Meeks Boyen, Home Service Director, the Hawaiian Electric Co., Ltd., for her efforts in preparing and distributing a special recipe booklet commemorating Hawaii's becoming the 50th state. This is Mrs. Boyen's third award, her first such honor coming during the early 1940's, and her second in 1957.
- Miss Dorothy Mims, Senior Home Service Representative, Florida Power & Light Co., for her efforts in teaching Seminole Indian women how to use the electric appliances in the reservation's new all-electric homes. (See story on page 55.)
- Miss Ethel F. Lord, Home Service Director, Jersey Central Power & Light Co.-New Jersey Power & Light Co., for her program of educating high school home economics students in the operations of their local electric utility through a series of field trips and demonstrations.

First Energy Institute to Be Held in Washington

THE First Energy Institute will be presented by the School of Business Administration of The American University on its campus in Washington, D. C., June 27-July 1.

Dr. Nathan A. Baily, Dean of the University's School of Business Administration, stated the purposes of the energy institute as follows:

- To promote a better understanding of past trends and to develop a basic appreciation of potential developments in the production, distribution and consumption of the major forms of physical energy.
- To bring about a clearer understanding of the nature, inter-relations and mutual problems of the producers and consumers of energy.
- To clarify and strengthen the role of private enterprise in the energy industries concerned through improved understanding of the nature and objectives of business-government relationships.

Dr. Arthur L. Rayhawk, Director of the Energy Institute and Professor of Marketing in the School of Business Administration at The American University, said the energy institute will offer a unique opportunity for mutual examination and exchange of information of those concerned with energy.

Dr. Rayhawk said executives and officials in the "upper middle" echelons of their organizations could benefit most from the Institute.

An advisory group is assisting Dr. Rayhawk in formalizing the scope and content of the institute's sessions. John Thornborrow, EEI Director of Economics and Statistics, is a member of this group.

New Report on U. S. Power Situation Available from the Institute

THE "1959 Year-End Summary of the Electric Power Situation in the United States," a report of the EEI Electric Power Survey Committee, is available from the Institute.

The summary was produced in cooperation with power systems and equipment manufacturers throughout the country and constitutes the most complete compilation of data available so early in the year.

The report presents information concerning the electric power supply, expansion of electric generating facilities and production of heavy electric power equipment in the United States as of the end of 1959. It is priced at $1.00 per copy.

Information on power supply presented in the report covers about 97 percent of the entire electric power industry, including both investor-owned systems and those of governmental agencies—Federal and non-Federal.

Data on the expansion of electric generating facilities and the production of heavy electric power equipment are virtually 100 percent complete. In addition to information on the eight Federal Power Commission power supply regions of the United States, the year-end report contains separate data for the State of Hawaii. The survey has not yet been extended to include the State of Alaska.

134 Safety Achievement Awards Presented Last Year

DURING 1959, EEI presented 134 Safety Achievement Awards to 46 member companies for attaining 1,000,000 or more accident-free man-hours of operation. In 1958 there were 129 awards made to 42 member companies.

From July 16 to Dec. 31, 1959, 47 awards were presented.

The Electric Operating Departments of Baltimore Gas and Electric Co. attained 4,065,549 man-hours of work without a disabling accident during the last six months of 1959.

The Electric Production Department of The Cincinnati Gas & Electric Co. was awarded a certificate for operating 3,000,000 man-hours without an accident. A 3,000,000-hour certificate also was presented to the Mechanical Construction Bureau, Station Construction and Shops Department, Consolidated Edison Co. of New York, Inc.

Awards for 2,000,000 Accident-Free Hours

Ten Safety Achievement Awards were presented during this period to departments which operated 2,000,000 or more hours without accident. They include the Western Division, Alabama Power Co.; Power Production Stations, Baltimore Gas and Electric Co.; Electric Distribution Department, Baltimore Gas and Electric Co.; Electric Department, The Union Light Heat & Power Co. (of The Cincinnati Gas & Electric Co.); The Cleveland Electric Illuminating Co.; Dallas Power & Light Co.; Georgia Power Co.; General Operations, Protection and Electric Maintenance, Central Meter, General Stores and Office of Northern States Power Co.; Substation Department, Potomac Electric Power Co., and Peter O. Knight Station, Tampa Electric Co.

Following is the list of 47 awards, from July 16 to Dec. 31, 1959:

Alabama Power Co.
- Chickasaw Steam Plant 1,224,242
- Montgomery District 1,190,451
- Western Division 2,000,410
- Mobile District 1,000,179

Appalachian Power Co.
- Logan Plant 1,000,000

Baltimore Gas & Electric Co.
- Electric Distribution Department, Overhead Division 1,000,445
- Electric Operating Departments 3,050,891
- Power Production Stations 2,004,690
- Electric Operating Departments 4,065,549
- Electric Distribution Department 2,008,804
- Electric Construction Department 1,003,623

The Cincinnati Gas & Electric Co.
- Electric Production Department 3,000,000
- Electric Production Department, West End Station 1,000,000
- Electric Distribution Department 1,334,203
- Electric Operating Department 1,137,342
- The Union Light Heat & Power Co., Electric Department 2,474,391

The Cleveland Electric Illuminating Co.
- Entire Company 2,041,900
- Entire Company 1,620,500
- Steam Power Division 1,000,000

Commonwealth Edison Co.
- State Line Station, Commonwealth Edison Co. of Indiana, Inc. 1,000,000

Consolidated Edison Co. of N. Y., Inc.
- Transportation Department 1,000,000
- Station Construction and Shops, Mechanical Construction Bureau 3,000,000
- Outside Plant Construction Department, Overhead (Line Crews) 1,000,000
- Production Department, Hell Gate Station 1,000,000

Consumers Power Co.
- B. C. Cobb Electric Generating Plant 1,013,079

Dallas Power & Light Co.
- Plant Department 1,098,800
- Entire Company 2,772,000

The Empire District Electric Co.
- Entire Company 1,016,669

Georgia Power Co.
- Entire Company 2,477,841
- Entire Company 1,617,384

Gulf Power Co.
- Entire Company 1,139,007

Iowa Power and Light Co.
- Red Oak District 1,002,361

New Orleans Public Service Inc.
- Electric System 1,163,538

Northern Indiana Public Service Co. 1,000,481

Northern States Power Co.
- General Operations, Protection and Electric Maintenance, Central Meter, General Stores and Office 2,000,000

(*Continued on page* 58)

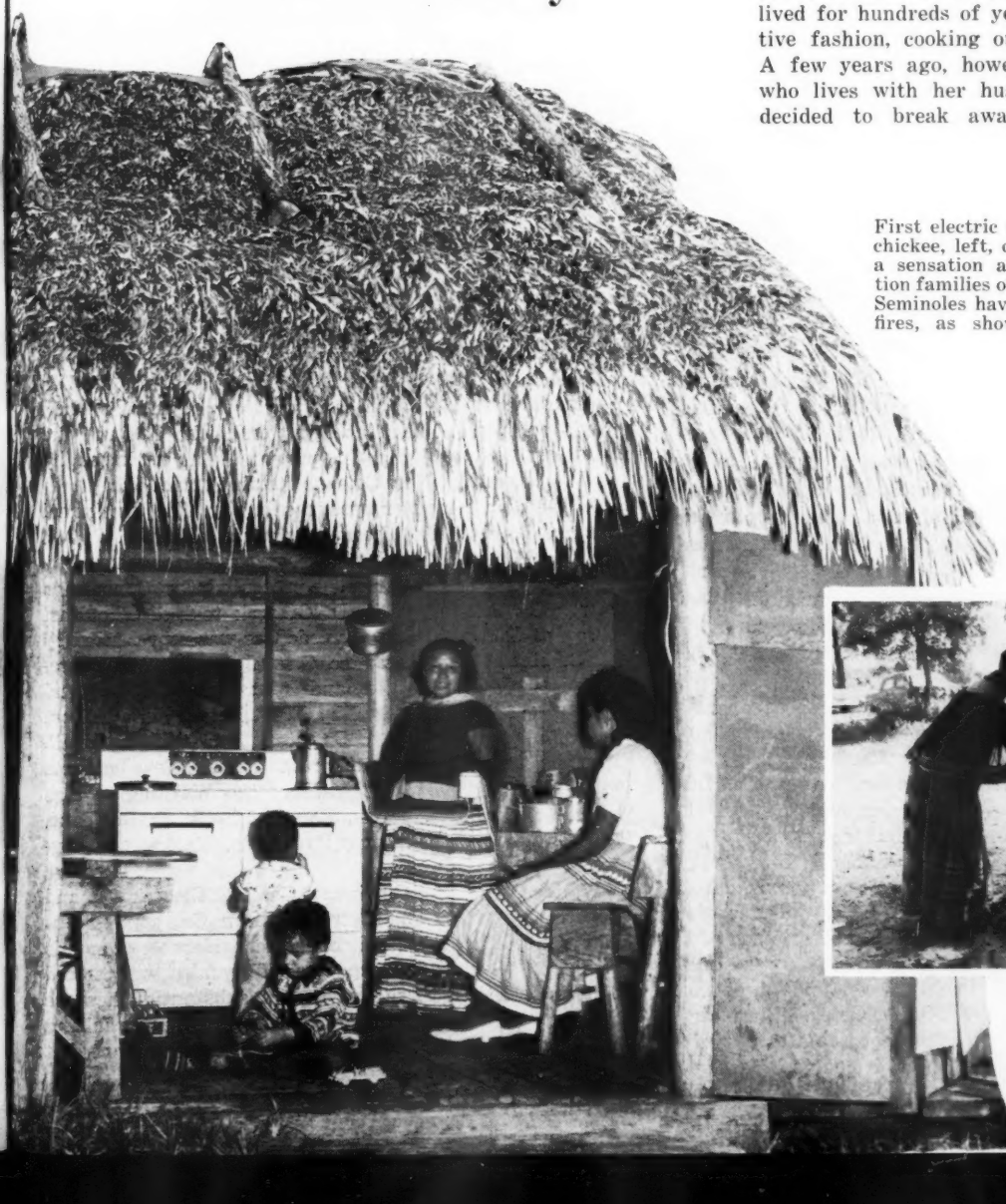
How the Seminoles Live Better Electrically

Miss Dorothy Mims, Home Service Representative for Florida Power & Light Co., instructs Seminole wife in operation of all-electric kitchen on the Dania Reservation.

AN electric range installed in the open-air chickee (hut) of a Seminole family in the Florida Everglades has helped considerably in overcoming a deep-rooted Indian superstition which discouraged them from trying anything new.

The Seminoles at Dania Reservation, just a few miles from Florida's fabled Gold Coast, have lived for hundreds of years in an almost primitive fashion, cooking outdoors over open fires. A few years ago, however, Mrs. Sam Franke, who lives with her husband and adopted son, decided to break away from tradition. She

First electric range installed in open-air chickee, left, of Seminole family created a sensation among the Indian reservation families of Florida. For centuries the Seminoles have cooked outside over open fires, as shown in photograph below.



bought an electric range. This took a great deal of courage.

The Florida Power & Light Co., which already had run a line to the reservation for lights, set a pole and installed a transformer in time for the Frankes to cook their Thanksgiving turkey electrically.

The other Indian women, who have fried their bread for centuries because there was no way to bake, left their homes and crowded around Mrs. Franke's chickee to watch her bake. She used packaged cake mixes and bread mixes to prepare treats for her family. Sometimes as many as 20 Seminole women shared the tasty food.

(Common Indian fare consists of grits and wild birds, now scarce on the reservation. Their favorite drink is the liquid from boiled grits mixed with baking soda.)

After the amazing success of Mrs. Franke's range (with her and the other women), the Seminole Tribe of Florida organized in 1957 and began working on programs for the development of their resources. A 40-acre tract on the Dania Reservation was plotted into blocks, lots, a park and recreation area.

A revolving credit program was developed with the assistance of the Bureau of Indian Affairs. Tribal funds and funds loaned to the tribe by the bureau were used to initiate this program, which makes loans to individual members of the tribe for the construction of new homes, the purchase of livestock and other productive purposes.

The impression Mrs. Franke's range had made on her neighbors was evidenced when the Seminoles, in their council, voted to build 49 homes equipped with the latest electrical appliances. Each one is being supplied with a built-in electric range, electric water heater, refrigerator, clothes washer and television.

Miss Dorothy Mims, Home Service Representative for Florida Power & Light Co., has played an important part in the efforts of the Seminoles to live better electrically. Taking a professional and personal interest in the welfare of the Indian women, she taught Mrs. Franke how to operate her treasured electric range. To do this, she had to engage an interpreter, as Mrs. Franke spoke no English.

Today as the new electric homes are completed, Miss Mims gives demonstrations of the use and care of all appliances to individuals and to groups of Seminole women, all with the aid of an interpreter.

Miss Mims says the women are fascinated by the pictures in the cookbooks, which they cannot read, and proudly wear the Reddy Kilowatt aprons given them by Florida Power & Light.

Because it is felt that Seminole children attending Florida schools will aid their parents into a better way of life, school demonstrations and explanations also are given by Miss Mims. The children then go home and assist their mothers.

Thus, great strides have been taken by an ancient race, moving all the way from near-primitive living conditions to the modern wonders of electrical living.

Electronics Seminar Stresses Importance of Computers

(*Continued from page* 47)

the subject discussed by a panel composed of E. D. Cowles of The Detroit Edison Co., Dexter Stoner of Pacific Gas and Electric Co., Leo Peck of Consumers Power Co. and the moderator, A. S. Reck of Union Electric Co. The final panel was composed of D. W. Keller, Columbia Gas System, C. D. Otcasek, The East Ohio Gas Co., H. R. Lenz, Philadelphia Electric Co., O. T. Johnson, Southern California Edison Co., plus the panel moderator, R. Van Wuyckhuyse of Rochester Gas and Electric Corp. "Justifying the Installation of a Computer" was discussed. The Tuesday sessions were climaxed by a visit to the new 705 Data Processing Center of Pacific Gas and Electric Co.

The General Session on Wednesday centered around the theme, "What We Are Doing with Electronic Computers." Company representatives discussed the latest developments in their installations and reviewed plans for the future. The first group of companies reported on their existing tape computer systems. The Citizens Gas and Coke Utility installation was reviewed by Don Essig. J. A. Comerford spoke on developments at Consolidated Edison Co. of New York, Inc., and A. J. Gebauer discussed computer progress at The Detroit Edison Co. Developments at Pacific Gas and Electric Co. were covered by Roy Dreiman, and Pacific Power and Light Co. operations were reviewed by D. P. Landry. Since certain utilities were unable to send representatives, their stories were summarized by other delegates. Developments at Arizona Public Service Co. were reported by E. T. White of Public Service Electric and Gas Co. The Commonwealth Edison Co. story was presented by Mark Salvino of the Peoples Gas Light and Coke Co., and the Northern States Power Co. progress was reviewed by A. J. Brodtman of New Orleans Public Service Inc.

In the card computer system category, The Cincinnati Gas and Electric Co. history was reviewed by W. J. Ott, and the Columbia Gas System progress was presented by D. W. Keller. J. P. Bromley presented the Consumers Power Co. story, and C. D. Otcasek told of The East Ohio Gas Co. operations. Laclede Gas was represented by M. G. Meadows; Milwaukee Gas Light Co. was represented by J. E. Harrison, and Pennsylvania Power and Light Co. was represented by F. F. Beisel. In addition, the Philadelphia Electric Co. story was told by H. E. Mueller; the Southern California Gas Co. developments were presented by J. W. Vanier; the Washington Gas Light Co. experiences were discussed by W. C. DeNeane, and the Wisconsin Electric Power Co. history was covered by J. G. Cadby.

Walter Ott of The Cincinnati Gas and Electric Co. and Devere Cowles of The Detroit Edison Co. pointed out that utility companies had realized considerable economic gain from electronic computers. They also emphasized that, in addition, there had been a substantial increase in accuracy of accounting procedures involved, resulting in reduced inquiries and in assurance to management that prescribed procedures are being followed.

Selling ALL Company Services

By Suzanne Wofford

Home Service Director, Mississippi Power & Light Co.

I WONDER how many home economists for utility companies look beyond the kitchen when selling our respective overall company services? To do justice to the company, we must remember there are many more ways to help our customers and communities than planning kitchens, demonstrating appliances or giving tips on cooking. For example, how many of our people know the role played by most utilities in community and industrial development?

Most of us have to work—for one reason or another. Our work can be a joy or it can be sheer drudgery. Because we work for a utility company, we have an obligation to the public—and our public relations problems are somewhat different from those of almost any other business.

If we are to continue to do a good public relations job, we should always keep these differences in mind:

- People can't see our product—Electricity is invisible, intangible, and mysterious. When Mrs. Doe shops for an article of clothing, she examines the texture and color and compares it with similar articles. When she buys food, she can examine it to determine if it is fresh. But when buying our service, she can't do this.
- We can't store electricity—If a department store anticipates a heavy demand for a certain article sometime in the future, it can stock up on that particular item and be ready to supply the demand. However, we can't do this. Our product is used as soon as it is produced.
- Our service must be always available—We have an obligation to furnish efficient, 24-hour-a-day service to all those people in our areas who want it. People just take for granted that when they flick the switch our service will be there.
- Our service contributes the most to better living—What is there that contributes more to our modern way of life than electricity?
- All of our sales are on credit—We don't do any cash business. People use our service before they pay for it. And, we can't repossess our product if it is not paid for.
- We serve everybody—Practically everyone in the territory which we serve is our customer, either directly or indirectly. This means that we serve all classes and types of people.
- We are regulated by law—Nearly all businesses today, of course, operate under some regulation. But the large number of regulations under which we operate makes us somewhat different than most of these businesses. We are required to make numerous reports to various governmental agencies, and this information is available to the public, our customers. Ours is truly a "goldfish" business.
- We have the right to operate—In the territories which we serve, we have the right to operate in the electric utility field. Does this mean, though, that we have no competition? The answer, of course, is "no." We compete with gas, coal, oil. The better the opinion that people have of us, the larger our share of the market will be. The right to operate is granted us by the people, and we must never forget that the same people who gave us that right can also take it away.

Keeping these differences in mind and actually understanding them, one must satisfy herself that she believes in her company and that she can justly take personal pride in it and its accomplishments. Before we can sell any of the services of our company, we must be thoroughly sold on these services ourselves. If put to a pinch, an ounce of loyalty is worth a pound of cleverness.

It is a basic part of man's make-up that he have pride in himself and pride in that with which he is associated. People take pride in being a part of something good.

Pride Considered

It is pride in our company that we want to consider. The way we do our work, the outlook we have toward the future, the way our family feels toward the company and the impressions the public has of our company is largely determined by the amount of pride we have in the company.

One of the measures of a "good" company with which to be associated is to answer the age-old and so often repeated question, "What's in it for me?"

Our working conditions are second to none. We have reasonable hours, good tools and equipment, and the pay scale is far above average. We enjoy the very liberal holiday, vacation and sick leave policies. We have compensation for any injury that may occur on the job and insurance for injury or illness when off the job. Our loved ones are provided for through our life insurance, and an income is provided for us when we reach the age of retirement. Our industry, though comparatively young, is one that has made great strides in its contribution to a better way of life and the future offers a challenge to each of us.

When we stop to think of the many ways in which electric service is used to make a more comfortable and abundant way of life, we cannot help having pride in being a part of it.

It is used in the factory to increase productivity which,

An address before the Fourth Annual Live Better Electrically Women's Conference, Chicago, Ill., Jan. 8, 1960.

in turn, provides more and better things for more and more people.

In the business establishment, it operates the cash register, the escalator, or furnishes light for the better display of merchandise.

It provides light in the home for better living, in the school room for better learning, and on our streets and highways for better safety.

It is an aid to health and comfort, whether it be in the form of light in the operating room, the operation of an iron lung, the pumping of the heart, or used as energy to cook meals, operate the refrigerator, or to heat and cool the home.

It lightens our work load on the farm by pumping water, operating milking machines, or automatic feeders.

In the home it operates the vacuum cleaner, the garbage disposal, the dishwasher, or the washing machine and clothes dryer.

Electricity lights the field for sports at night, or operates the model train, the TV set, or the hi-fi set.

Many of the activities of our company toward the development of its service area cannot be reduced to a few words, and the end result of specific programs and activities are far-reaching and hard to measure.

How does the company help in development of its service area?

My company provides steady employment for people who are active citizens in their home communities. It is interested in the youth of our state, and sponsors 4-H work and other similar activities.

A good corporate citizen, it bears its share of the cost of government. It sponsors a program for community development. Agricultural development is also a part of its program of activity. My company is active in the industrial development of the area.

The pride should cause us to perform at our best on the job and to tell our friends and neighbors the story of our company. We have a story to tell. We have many opportunities in casual and informal conversation to remind others of the value of our service.

If electric utility companies are to continue to be the outstanding organizations we know them to be, we must tell their stories. We must become thoroughly familiar with all phases of our companies' activities.

The home economist has a personal stake in selling the services of her company and, perhaps, in one way of looking at it, the largest. Our very future hinges largely on the way we do the job we have. We can go along doing our work just well enough to get by, or put forth that little extra effort and have the personal satisfaction and the other benefits that come from knowing we have done our best.

It is my observation that most home service people actually look on themselves as step-children in the utility.

Could this be our fault? Somewhere it seems to me that we have become lax in our communications, inside and outside of our companies.

Do our fellow employees actually know what work we do in home service or do they have just a vague notion? Are we familiar enough with our fellow employees' jobs so that we can communicate to our customers in an informal and interesting manner?

It has been said time and time again that the home service representative has more access to the customer in her home than any other employee in the company. We should take advantage of this. Our industrial department men work diligently to bring industry into our service area. When they are successful, they receive no credit. It goes to the local chamber of commerce or similar groups.

Double Selling Service

It would be a reward to them if the home service representative could mention their work when she is in the home of a customer. Instead of selling just her service, she is selling another service of the company. The industrial salesman does likewise when he tells his clients about the help offered by the home service department.

Do you sell the services of your department? Are you a manager of yourself? Do you plan your own work and stay busy or do you wait for your manager to tell you what to do? In reporting, we should sell home service as a total service to management. The report must not be considered a necessary evil that has to be done and so is done in a matter of minutes with very little thought. Management is vitally concerned with the dollar and how it is spent for best returns; it has to be. Does our manager have to justify our being on the payroll? Are we making it easier for them to keep us in the position of step children?

To our friends, neighbors and customers, we are the company. So we must sell the company and what it has to offer its customers in its entirety.

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134 Safety Achievement Awards Presented in 1959

(*Continued from page 54*)

Pacific Gas and Electric Co.
- Coast Valleys Division, Steam Generation Department 1,000,000

Pennsylvania Electric Co.
- Northeastern Division 1,033,498
- Entire Company 1,194,372

Potomac Electric Power Co.
- Substation Department 2,004,241

Tampa Electric Co.
- Peter O. Knight Station 2,006,442
- Transmission Department 1,000,645
- Entire Company 1,058,560

Texas Light & Power Co.
- Entire Company 1,348,233

Union Electric Co.
- Transmission & Distribution Division 1,005,940
- Supply Service Division 1,000,691
- Keokuk Plant 1,000,067

Wisconsin Power & Light Co.
- Lake Geneva District 1,030,611

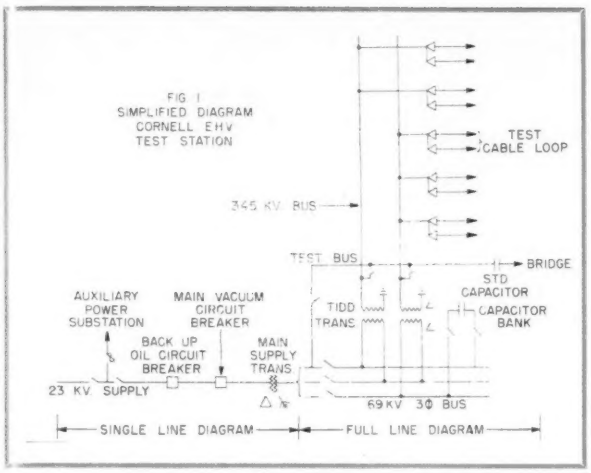
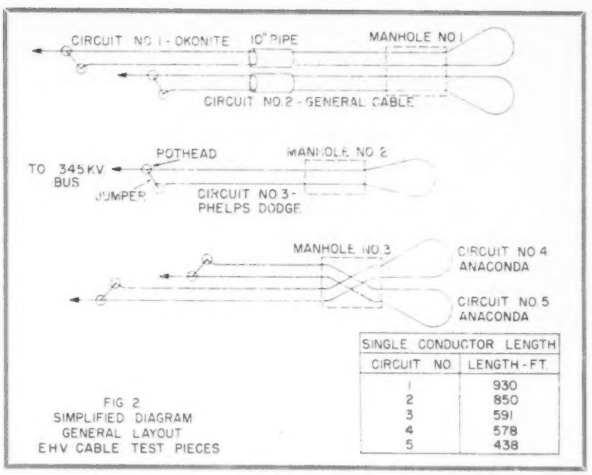


Figure 1



SINGLE CONDUCTOR LENGTH	
CIRCUIT NO.	LENGTH - FT.
1	930
2	850
3	591
4	578
5	438

Figure 2

Progress Report No. 5

AEIC-EEI Extra-High-Voltage Cable Field Test Project

By L. G. Smith and G. P. Adams

EEI Representatives, Steering Committee

THIS report supplements those previously presented before the EEI Transmission and Distribution Committee on the extra-high-voltage cable testing project at Cornell University.

Station Layout

The design of the test station has been completed, and is shown in simplified form in Figure 1. Energy is supplied to the station at 23 kv by the New York State Electric and Gas Corp. over the subtransmission line indicated in the lower left corner of the diagram. The main circuit breaker for the station is a vacuum type and is backed up by a standard oil circuit breaker. The supply voltage is increased to 69-kv for the tidd transformers. Two Tidd transformers are used to provide the extra-high-voltage for the tests: a prior commitment for one of the units precluded the use of all three at Cornell. To balance the load on the supply line, a capacitor bank is to be installed on the 69-kv bus. The testing of the cables will be with single-phase voltage as discussed in a previous report.

The 345-kv bus extends from the terminals of the tidd transformers, and the closed cable loops are connected directly to this bus. Crossing the main 345-kv bus perpendicularly is a test bus. By means of the test bus, periodic power factor measurements of the cables and accessories can be made at the extra-high-voltage, and, with appropriate switching, power factors can be measured at 40 kv, this voltage being obtained from the 69 kv bus.

Current loading transformers will be installed on the cable risers and current to these units will be adjusted to induce the required number of amperes to flow in each closed cable loop to achieve the scheduled conductor temperatures. Energy for this purpose will be provided from the auxiliary power substation, which is not shown on the diagram.

Much of the equipment for this station is being made available through the generosity of manufacturers. As some of the many fine examples, the vacuum circuit breaker and one of the 345-kv switches are being provided by Joslyn, the 23/69-kv transformer by General Electric, the Tidd transformers and capacitor bank by Westinghouse, the 345-kv bus by Anaconda, two 345-kv switches by I-T-E Circuit Breaker and one 345-kv switch by Southern States Equipment. A detailed listing will be provided in a subsequent report to help insure proper recognition of the valuable help of all manufacturers which are making contributions.

Cable Layout

Figure 2 is a simplified diagram of the layout of the cables in the test field. Loops 1 and 2 consist of pipe-type cable furnished by Okonite and General Cable. The 10-in. pipes are installed in separate trenches four feet apart. Loop 3 consists of high-pressure self-contained cable manufactured by Phelps Dodge. This cable and those furnished by Anaconda for the purposes of this test will be installed in conduit lines. The Anaconda samples will form loops 4 and 5 in duct lines four feet apart. One of these is a low-pressure, oil-filled cable and the other a cable with synthetic insulation.

Progress of Construction

The underground portion of the station, aside from installation of cables themselves, is essentially complete. That is, pipes and manholes have been installed for the pipe-type cables and ducts and manholes for the duct-lay cables. Thermocouples are in place on the pipes and in the duct structure for monitoring cable temperatures. (Additional thermocouples will be installed on pipe cable shielding tapes, on the sheaths of the self-contained cables and on joints when the cables are installed.)

Work on the above ground portion of the station began in October, 1959.

Cable Design and Testing by Manufacturers and Installation

The cable manufacturers have continued their excellent work to produce 345-kv cables capable of carrying loads in excess of 500 mva. Information on results of laboratory tests by the manufacturers indicates the likelihood of good performance of their samples under field testing. The following material was prepared by the respective cable manufacturers, and describes the cables in more detail than has heretofore been presented and also gives an indication of the extensive research, test and development work carried out by the manufacturers.

Okonite—"Following extensive development work on low loss insulation which involved 550 model cables using 31 varieties of paper from seven suppliers and numerous petroleum and synthetic oils, the Okonite Co. manufactured early in 1959 a 1200-ft. length of single conductor, 2,000,000-cm, segmental, copper-conductor cable. This was insulated with 1.035 in. of graded paper insulation and impregnated with a special medium viscosity oil. This cable was designed to be installed with three conductors in a 10¾-in. steel pipe, the pipe being filled with a lower viscosity special oil and maintained under 200-lb. pressure for operation at 345-kv between phases. This full reel length was subjected to the standard AEIC routine tests and a sample, including a joint, was subjected to the AEIC high voltage time test, the last step at 450-kv to ground equivalent to 780-kv, three phase, being maintained for 24 hours.

"This same sample of cable was then subjected to over-voltage and high-temperature testing for approximately four months, reaching temperatures of 110 C and a voltage of 450 kv phase to phase (260-kv conductor to shield). No change in the electrical characteristics of the cable occurred during this test period.

"Another sample of cable was installed at the Ohio Brass Co.'s laboratory with another joint and subjected to impulse testing in accordance with the procedure set up by the AEIC committee. No failures were obtained in this impulse test, nor was any evidence of distress found upon examination of the cable after either this test or the life test.

"The balance of this same length was cut into suitable cutting lengths for installation at Cornell and was shipped to them on Nov. 4, 1959, and installed on Dec. 4, 1959. The installation, including the two joints and the terminals, was completed about the middle of December and the cable is now being maintained under oil pressure awaiting arrival of the test equipment at Cornell." [1]

Phelps Dodge—"The Phelps Dodge construction for the cooperative AEIC-EEI-manufacturers' extra-high-voltage cable test program developed into a new self-contained, high-pressure, oil-filled, paper-cable system, pressurized at 200 psig by a pumping plant and spliced with mechanical joints. The impregnant viscosity characteristics permit compensation hydraulically for over five miles from a single pumping station. Moreover, the impregnant can be solidified with a dry-ice freeze, thereby facilitating splicing and circuit extensions as practiced in pipe cable operations.

"The conductor size for the 500 mva requirement of the Cornell program is 2000 mcm. The cable consists of a continuously annealed, six-segment, compact-segmental copper conductor with 0.69 inch hollow core, one inch of graded insulation, 220 mils tubular aluminum sheath and 115 mils black pigmented high density polyethylene jacket. The laboratory development program included full scale prototype runs on six segment conductors up through 2500 mcm, with plastic tape insulations, as well as paper, both up to 1250 mils thickness. Papers, made with specially filtered water and with deionized water, were evaluated, in densities from 0.65 to 1.2 and thicknesses from 0.8 mil to 7 mils. High voltage tests were made up to 680 kv (approximately 3½ times operating voltage) to ground 60 cycle and 1300-kv impulse 1½ by 40 wave. Load cycle tests were run on three separate 345-kv setups, for up to six months' duration, with conductor loading to an average copper temperature of 100 C on the hot cycle. Two of these setups were run at a maximum voltage of 290-kv to ground, and the third, which included a crepe paper splice, was heat cycled at 373 kv.

"Both G&W prototype 345-kv condenser potheads and G&W standard 230-kv potheads were employed in the load cycle test programs. A full-scale, 345-kv splice assembly, including cable trained to a five-foot offset and O-ring sealed mechanical joint sleeves, was subjected successfully to manhole bending for 100,000 one-minute cycles with a nominal three-inch stroke. This test was pressurized with a mixture of Freon and nitrogen to 200 psig, permitting continuous monitoring with a Halogen leak detector. Tools have been developed to facilitate stripping of the aluminum sheath and the forming of manhole bends."

The Phelps Dodge cable is scheduled to be installed in February 1960." [2]

Anaconda—"Anaconda manufactured, in 1958, four prototype cables for comparative evaluation. Each has a conductor size of 1700 mcm; each is a low-pressure

(20 psig gauge), oil-filled, self-contained cable. The four cables differ in type and thickness of insulation; three cables have paper insulation; one cable has synthetic insulation; each has a different oil. Two types of tests are being conducted: specific properties tests, and long-time, cyclic-aging tests. Specific properties are power factor variation with temperature, power factor variation with voltage stress, ultimate a-c dielectric strength and ultimate impulse strength. Long-time, cyclic-aging tests duplicate service conditions by imposing continuous voltage and steady or a daily cycle of load current. Levels of each are raised as stability is reached at a previous level. All four cables, with appropriate terminals, were placed on cyclic-aging test on Dec. 5, 1958, and all were operating on Dec. 5, 1959. At present, the cables are operating at $450\sqrt{3}$ kv; conductor temperature is 100 C, and each cable is carrying 1,090,000 kva. The synthetic-insulated cable looks especially promising for high-voltage and extra-high-voltage transmission because of its lower charging energy and lower dielectric losses." [3]

The two types of cable samples will be ready for installation in April 1960.

General Cable—"General Cable Corp. is planning on supplying high-pressure, oil-filled, pipe-type cable for the 345-kv field trial at Cornell. The conductor size will be 2000 mcm and the insulation thickness will be approximately one inch. The cable has been manufactured on a newly installed 345-kv production line which is capable of insulating commercial lengths of 345-kv cable in a single pass through the machine.

"A number of new and novel features have been incorporated in this new production line. For example, the taping heads are provided with such features as precalibrated springs for tape tension control, compensating means for maintaining tape tension constant independent of pad dimensions, automatic device to bring the machine to a stop before a tape runout occurs, provision for accelerating the speed of the machine at a predetermined rate from standstill to running speed thus avoiding tape 'wander,' etc.

"In addition, the entire production line is housed in an enclosure provided with air conditioning equipment capable of maintaining a constant relative humidity at any selected value down to as low as 10 percent. The moisture content of the insulating paper is brought into equilibrium with the relative humidity selected for manufacture by passing the paper, in wide sheet form, through a series of heated rolls and then into a slitting room maintained at the selected relative humidity. Here the 'jumbo' rolls are slit into pads and the latter then transported by way of an air conditioned conveyor system to each taping head location.

"A still further novel feature of the new line is the 'traversing take-up'—namely a take-up reel—which is mounted in a floor pit and free to move in both a horizontal and vertical direction and the movement so synchronized with that of the taping machine that the point on the take-up reel which the cable is to occupy is always directly in line with the axis of the caterpillar capstan and the taping heads, thus eliminating the more or less indeterminate bends and twists to which a cable in the dry (and hence in the least flexible state) is subjected in its movement back and forth across a conventional fixed position take-up reel.

Because accelerated test studies on oil-filled cable have indicated that metals, and bare copper in particular, can have an important catalytic effect in the development of deleterious products when in contact with mineral oil at temperatures and electrical stresses of interest in high-voltage cable application, direct contact between bare copper and oil is to be kept to a minimum in the cable to be supplied for the field trial. To accomplish this, the 2000-mcm copper conductor will be concentrically stranded but a major portion of the individual wires will be coated with a thin layer of a synthetic enamel. The excellent self-fluxing and solder-ability characteristics of the enamel employed will make it feasible to remove the enamel from the individual wires by flushing with hot solder prior to application of a conventional pressed connector. Insofar as ac/dc resistance ratio is concerned, theory indicates and measurement confirms that enameling of the strands eliminates proximity effect both 'in air' and 'in pipe.' As a result the overall three-phase 'in pipe' ac/dc ratio for a 2000-mcm concentric conductor with enameled strands has been found to be comparable to that for a 2000-mcm compact segmental conductor. In order to minimize bare copper-oil contact in the system as a whole, tinned copper, aluminum, stainless steel or non-metallic materials will be employed for shielding tape, skid wire, riser pipe, etc. Prototype samples incorporating the above described features have been load cycled without failure up to conductor temperatures of 100 C and up to voltages of 300 kv, conductor to ground (i.e., at a voltage equivalent to 520 kv three phase." [4]

The general cable sample will be installed at Cornell in April, 1960.

W. A. Chester, Inc.—The installation of the cables at Cornell, including splicing and terminating, is being performed under a contract with W. A. Chester Inc. The favorable terms of this contract are another example of the cooperation which the Steering Committee has been receiving.

Budget

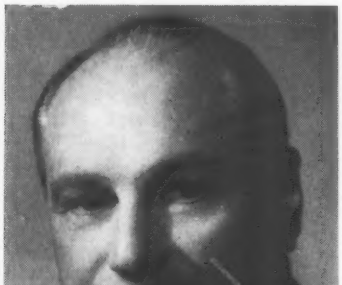
The estimate of July, 1958, of $500,000 has been revised upward by 30 percent or $150,000. Forty percent of the increase is due to increases in construction costs; the remainder is essentially the result in improvemenst in design and facilities for testing. Increases in costs were anticipated, and a portion of the increased money will be obtained from the contingency fund originally established by the individual utility contributors, with the remainder coming from EEI and AEIC.

Extra-High-Voltage Cable Conference

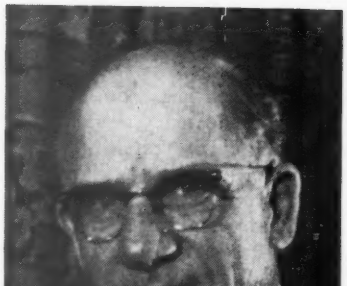
With the full support of the AEIC-EEI Steering Committee, the AIEE Insulated Conductors Committee is sponsoring an extra-high-voltage cable conference at Elmira-Ithaca, N. Y., in the fall of 1960. One of the main purposes of this conference is to draw papers from and to attract the attendance of the foremost minds in the field of underground cable in Europe. Preliminary information indicates that that objective will be readily achieved. The papers which will be presented are intended to crystallize the status of the art and will be limited to those concerned with cables operating at volt-

(*Continued on page* 64)

People in Power



E. H. WILL



R. S. NELSON

D. C. BARNES

E. G. TWOHEY

E. H. WILL, President of the Virginia Electric and Power Co., has been elected Chairman and chief executive officer of the company. He succeeds D. C. BARNES, who becomes Honorary Chairman.

Mr. Will began his career with Virginia Electric and Power in 1922, occupying various positions until 1950, when he was elected vice president. He was elected president in 1956 and became vice charman of the board of directors and chairman of the Executive Committee in 1958.

An active leader in civic affairs, he is a member of the Board of Visitors of Virginia Polytechnic Institute and of the Conservation and Economic Development Commission of Virginia. He is president of the Virginia State Chamber of Commerce and the Carolinas Virginia Nuclear Power Associates, Inc. He is a director of The Chesapeake and Ohio Railway Co. and The Central National Bank of Richmond. He also serves as a member of the Executive Committee and director of the National Association of Electric Companies.

Mr. Will has served as a member of the EEI Board of Directors.

Mr. Barnes has had a long and distinguished career in utility and financial circles. Following his graduation from Harvard College with an A.B., and from Harvard University with a B.S., he joined the Stone & Webster interests and, in 1931, was associated with Engineers Public Service Co., becoming president in 1937. In 1947, when the stock of the company was distributed, he came to the Virginia Electric and Power Co. as chairman of its board of directors and principal executive officer.

Mr. Barnes will continue his close association with the company as its honorary chairman of the board in an advisory and consulting capacity.

Mr. Barnes had been a member of the EEI Advisory Committee since 1944, and prior to that time served as a member of the EEI board of trustees. Last fall, Mr. Barnes completed 50 years of service in the utility industry.

R. S. NELSON, President of Gulf States Utilities Co., has been named Chairman of the Board of the company. He continues as President.

Mr. Nelson began his utility career in 1915 as a switchboard operator and office engineer at the Blackstone Valley Gas & Electric Co. in Pawtucket, R. I.

He has served with electric companies in several states and in Puerto Rico and the British West Indies. In 1930 he was named manager of the electric department in Richmond of the Virginia Electric and Power Co. He later was president of the Baton Rouge Electric Co. and the El Paso Electric Co. In 1942 he was named president of Gulf States Utilities.

Mr. Nelson in 1956 received the Golden Deeds Award of the Exchange Club of Beaumont for his years of distinguished leadership in civic affairs.

Mr. Nelson is a member of the advisory board of the Texas Fund, Inc., and the Rotary Club of Beaumont. He is a director and chairman of the Finance Committee of the Beaumont Chapter, American Red Cross. Vice president and a director of the Texas Atomic Energy Research Foundation, Mr. Nelson also is a director of the Southwest Atomic Energy Associates.

E. G. TWOHEY, for the last two years Vice President and General

Manager of The Narragansett Electric Co., has been elected President of the company. He succeeds WILLIAM WEBSTER, who recently became President of the New England Electric System. Since joining Narragansett, Mr. Twohey also has been president of Attleboro (Mass.) Electric Co.

Mr. Twohey joined the New England Electric System upon his graduation from Norwich University in 1925 and has held executive positions with system companies in Lowell, Lawrence, Northampton and Worcester. Prior to going to Narragansett he was chief executive officer of all NEES gas companies in Massachusetts.

He is a director of the United Fund, R. I. Public Expenditures Council, Greater Providence Chamber of Commerce, Providence Chapter of the American Red Cross, and is a member of the corporation of the Providence Institution for Savings.

M. F. BEEBE and E. H. WALTON have been named Vice Presidents of The United Illuminating Co.

Mr. Beebe, who joined United Illuminating 43 years ago, has been general superintendent since 1950. He has served as field engineer, supervisor of overhead lines, superintendent of distribution in the New Haven Division, general superintendent of production and superintendent of operations.

Mr. Walton joined the company in 1942 as a mechanical engineer. He then became assistant superintendent of production, assistant to the president and assistant general superintendent.

J. E. MCCORMACK, Assistant Vice President of Consolidated Edison Co. of New York, Inc., has been elected Vice President of the utility with responsibilities in the field of production and operation.

Mr. McCormack began his career in the utility industry with the New York & Queens Electric Light & Power Co., which later merged with Consolidated Edison. He became distribution engineer for Consolidated Edison in 1937. As chief distribution engineer for the company, he played a leading role in the integration of electric and gas transmission and distribution work.

Other new appointments at Consolidated Edison are: DR. S. C. FRANCO to Executive Medical Director; W. C. BEATTIE, DR. W. P. ECKES and G. R. MILNE to Assistant Vice Presidents; T. C. DUNCAN to Chief Electrical Engineer, and H. W. DIERMAN to Chief Mechanical Engineer.

CHARLES BOLTON, Comptroller of The Hartford Electric Light Co., has been elected Financial Vice President of the company. He will continue as comptroller in addition to his new responsibilities. He succeeds the late R. B. CURRAN.

Mr. Bolton served in the accounting department of The Connecticut Power Co., now integrated with Hartford Electric Light, for 36 years. Prior to joining Connecticut Power in 1922, he worked as an accountant for Stone & Webster Co. and served with the Tampa Electric Co. as assistant chief clerk. He transferred to the Key West Electric Co. as chief clerk and subsequently joined The Connecticut Power Co. as an accountant. Progressing from assistant secretary in 1934 to vice president and secretary-treasurer in 1952, he became financial vice president for Connecticut Power in 1956.

BRIG. GEN. A. H. DOUD has been appointed Associate Director of Public Relations for Rochester Gas and Electric Corp. He was formerly the assistant manager of the department.

Gen. Doud came to RG&E in 1924 and was employed in the Electric Distribution Department. In 1940 he left for military duty. Upon his return in 1945, he was made safety director of RG&E, and in 1953 he was promoted to assistant director of public relations.

He is a member of the Rochester Chamber of Commerce, Industrial Management Council, American Gas Association, chairman of the Business Climate Action Committee of Associated Industries of New York State, and is active in many civic organizations.

He is a brigadier general in the New York Army National Guard, and is commanding general of the 27th Armored Division Artillery of the New York Army National Guard.

J. R. UNDERKOFLER has been named Controller of Wisconsin Power and Light Co. J. E. ZWETTLER was named Assistant Controller and L. W. HANSON was appointed Budget and Accounting Research Director.

All three positions are newly created in a move to better coordinate the company's accounting activities.

An employee of Wisconsin Power and Light since 1950, Mr. Underkofler began his service as junior insurance and claim agent. He is a graduate of the University of Wisconsin Law School.

F. H. MARKLEY, Assistant Vice President, Financial, has been promoted to Vice President, Financial, of Pennsylvania Power & Light Co. He succeeds A. D. ROOT, retired.

Mr. Markley brings 35 years of company experience and service to his new position as chief financial officer of PP&L. He joined PP&L in 1925, following several years with firms in Easton and Philadelphia. He held accounting and auditing positions of increasing responsibility within the company's financial organization and was named assistant treasurer in 1946. He served as treasurer from 1952 until his appointment in 1957 as assistant vice president, financial, the position he held until this most recent promotion.

During his 15-year tenure as chief financial officer of PP&L, Mr. Root guided its financial operations through its most active period of expansion and modernization. Over $285 million in securities were sold and widespread ownership of PP&L capital stock achieved within the company's service area and in the state of Pennsylvania. Through this financing program, together with property acquisitions in which Mr. Root also played a vital role, the physical plant of the company was expanded from $182 million to the present-day figure of approximately $600 million.

H. L. CHANDLER has been named Vice President of the New England Gas and Electric Association Service Corp. He will be concerned with public relations.

R. E. WRIGHT recently was named Vice President for Sales of the New England Gas and Electric Association.

Mr. Chandler, a graduate of Dartmouth College and Harvard Law School, joined NEGEA in 1946. Mr.

Wright joined the New England Gas and Electric system in 1930 as a supervisor of house heating and commercial sales. In 1957 he was made director of gas and electric sales for NEGEA.

R. E. HODGES recently was elected Vice President and General Manager of the Appalachian Power Co., a major operating company of the American Electric Power system.

Mr. Hodges, who has been assistant general manager, succeeds G. L. FURR, who has retired as general manager. Mr. Furr will continue to serve as a vice president and consultant to the company.

Mr. Hodges joined Kentucky Power Co. of the AEP system in 1926, following his graduation from West Virginia University. In 1940 he was named assistant general manager of that company, and in 1943 general manager. He moved to Appalachian's Charleston, W. Va., Division as division manager in 1948, and to Roanoke as the company's assistant general manager in 1954. He is a member of the Roanoke Valley Regional Planning and Economic Development Commission and a past president of the Public Utilities Association of the Virginias.

Mr. Furr's long career with Appalachian began in 1916 in Bluefield, W. Va., following his graduation from Virginia Polytechnic Institute. He was named manager of the Bluefield Division in 1943; assistant manager of the company at Roanoke in 1956, and vice president and general manager in 1952. He is rector of the Board of Visitors of VPI, a past president of the Public Utilities Association of the Virginias, and a past president and director of Southeastern Electric Exchange.

Carolina P & L, Duke Plan for Youth Atom Conference

CAROLINA Power & Light Co. and Duke Power Co. this year will recognize outstanding Carolina science students and teachers again with awards in the form of expense-paid trips to the National Youth Conference on The Atom.

The second annual conference will be held at the Museum of Science & Industry in Chicago, Oct. 20-23.

Each company will make the awards to two students and their teachers from their two-state service areas. Selections will be made from among physical science exhibitors in the science fairs sponsored by the Science Academies in the two Carolinas.

Eligibility for the 1960 conference awards is limited to 10th and 11th grade students since the conference date comes within the new school year. Candidates must be members of families served by CP&L and Duke.

The three-day conference, heralded last year as one of the most successful science-youth projects in the nation, will feature addresses by some of the country's top atomic scientists, exhibits and displays, panel discussions, "get acquainted" sessions and other activities.

A highlight of the conference will be tours of the three atomic test reactors at Argonne National Laboratory and tours of the Museum's 400,000 square feet of scientific and industrial exhibits.

Some 61 electric companies and several national science organizations and agencies, including the Atomic Energy Commission, will sponsor the conference.

AEIC-EEI Cable Field Test Projects

(*Continued from page* 61)

ages above 138 kv. Included as a feature of the conference is an inspection trip to the Cornell cable test station and a discussion of the test setup and procedure.

Conclusion

In conclusion, the construction of the test station is well under way. One cable has been installed, and there is every indication the remaining samples will be in place by April, 1960. The formally scheduled tests should begin about June, 1960. All this is being achieved through the excellent cooperation and significant contributions of effort and of materials and equipment by many interested groups.

Reference and Notes

Submitted by: Dr. J. R. Wiseman, The Okonite Co.[1]; E. J. Merrell, Phelps Dodge Corp.[2]; L. F. Hickernell, Anaconda Wire and Cable Co.[3], and M. H. McGrath, General Cable Corp.[4]

Specification Available on Steam Turbines

THE new "Recommended Specification for Speed-Governing of Steam Turbines Intended to Drive Electric Generators Rated 500 Kw and Larger" is available from the American Institute of Electrical Engineers, 33 West 39th St., New York 18, N. Y.

The purpose of these specifications is to recommend minimum functional and performance characteristics (relating to the speed-governing of steam turbines intended to drive electric generators) that may, if desired, be included in prime-mover purchase specifications. The specifications apply to various types of steam turbines, rated 500 kilowatts and larger, and intended to drive electric generators at constant speed.

The publication, AIEE No. 600, is priced at $1.00 per copy. Orders should be sent to the AIEE general office.

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